SPECIAL EatingWell EDITION

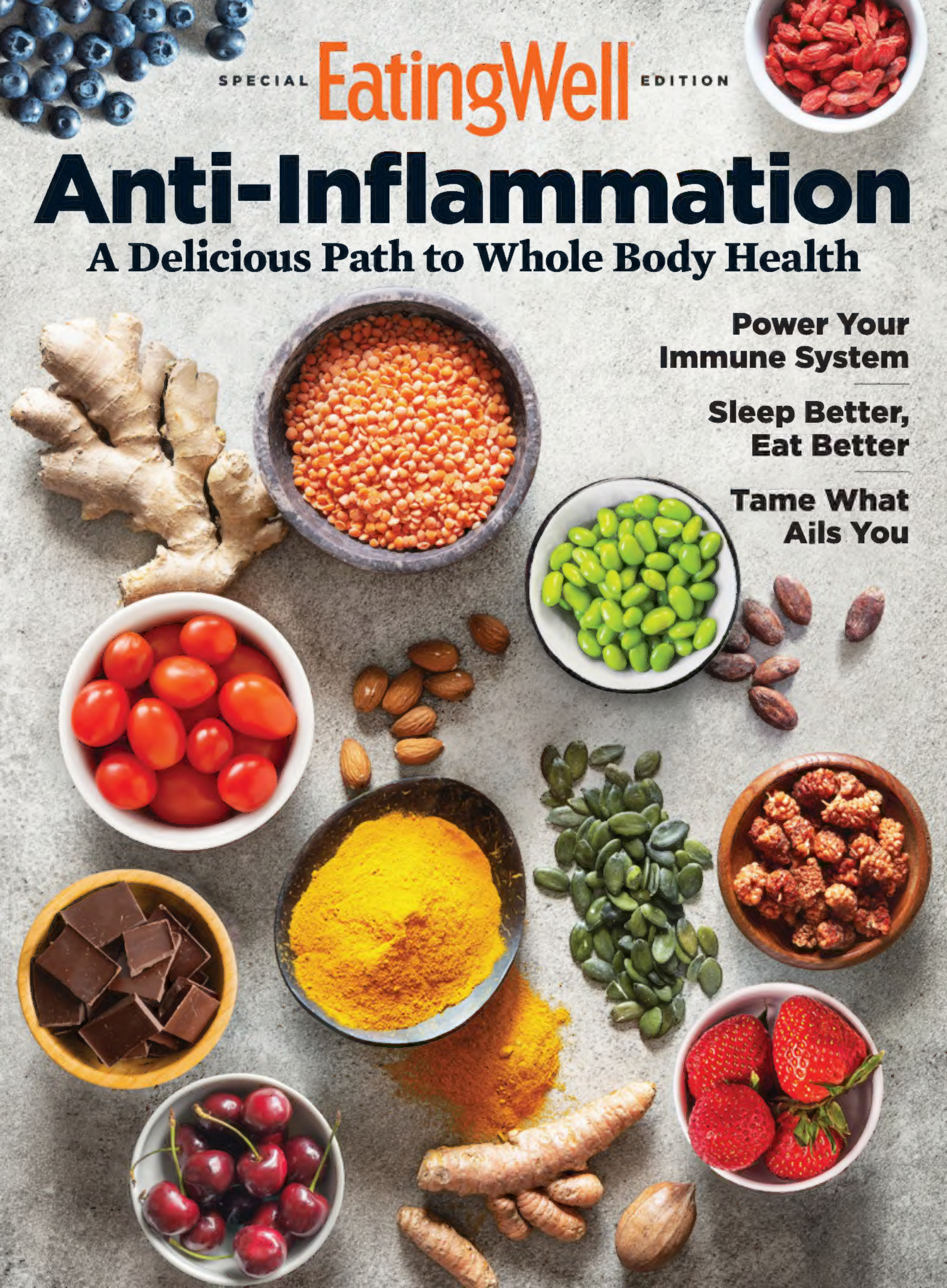
Anti-Inflammation

A Delicious Path to Whole Body Health

Power Your Immune System

Sleep Better, Eat Better

Tame What Ails You



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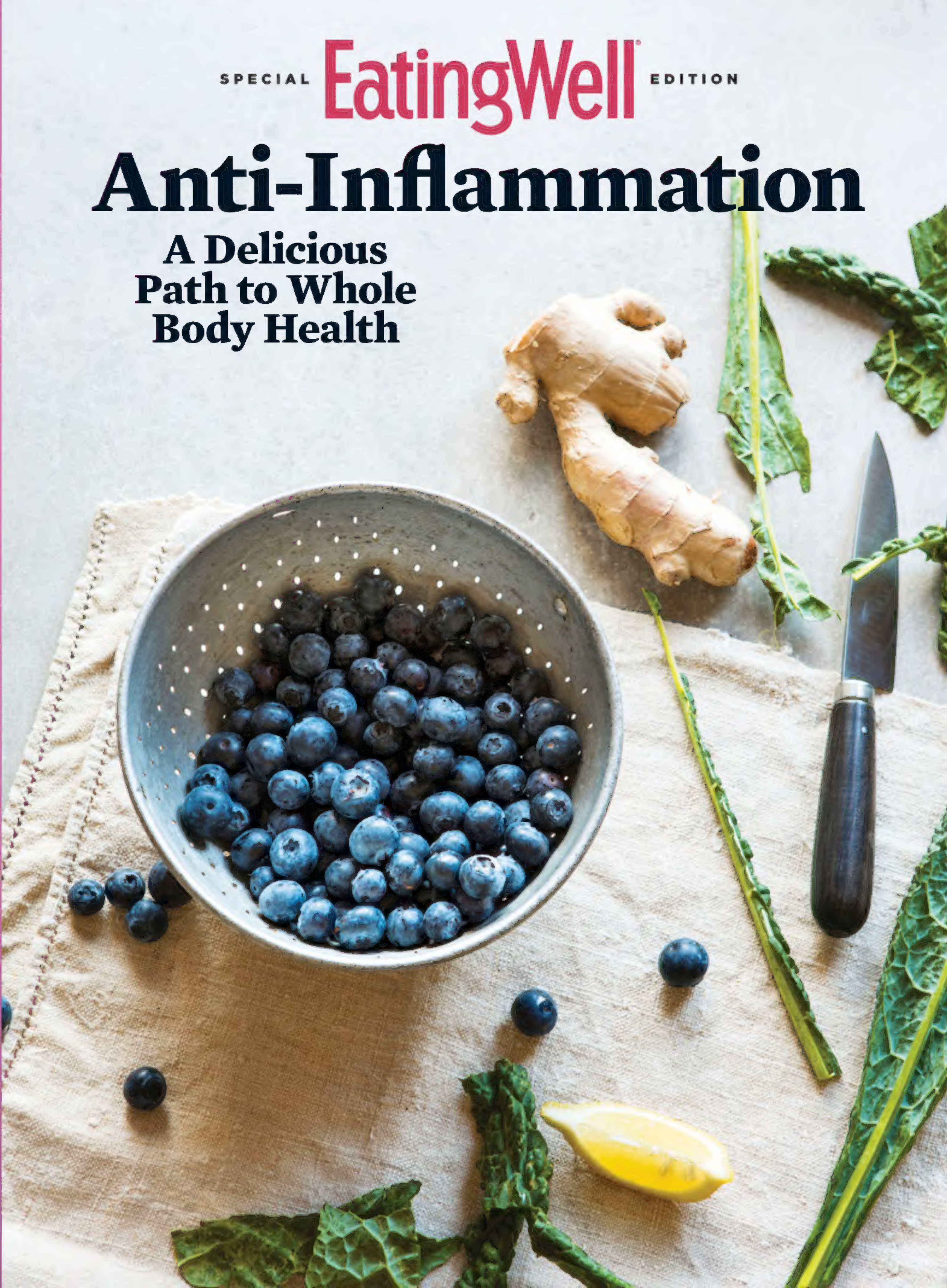

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Parts of this special edition were previously published by *EatingWell*.

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INTRODUCTION

THE HIDDEN HEALTH FACTOR

In recent decades, researchers have discovered that many diseases are tied to a process that would otherwise keep us healthy: inflammation.

BY JOYCE HENDLEY

Since the beginnings of modern medicine, inflammation has been understood to be a good thing—the result of the body's amazing capacity to heal itself. Inflammation is the way the body responds to infections and injuries, with the immune system releasing white blood cells and other factors to fight off invading pathogens and speed healing.

But in recent years, science has revealed a more dangerous side to inflammation, when the immune system is turned up too high or lingers too long—a condition known as chronic inflammation. Also called systemic inflammation, it's when white blood cells and their chemical messengers remain on alert at a low level, causing quiet but persistent damage that can lead to other diseases. In fact, more than half of all deaths worldwide can be attributed to an inflammation-related disease.

Our understanding of inflammation's role in disease began in the 1970s and '80s, when researchers were investigating why so many Americans were falling victim to heart disease—then (and now) our nation's top killer. One of the deadly hallmarks of heart disease is a buildup of cholesterol-laden fats in the arteries, but no one was quite sure how or why the plaques formed.

A breakthrough came when researchers at Tufts University discovered that cells in artery walls could secrete a substance called interleukin-1 (IL-1), a potent inflammatory compound. Responding to a signal, such as arterial damage or the presence of cholesterol, IL-1 could recruit white blood cells to stick to artery walls—eventually forming the harmful plaques that can lead to hardened arteries, high blood pressure and, sometimes, a heart attack. A new view of heart disease and its treatment began to emerge.

In the decades that followed, scientists have connected IL-1 and other biomarkers of inflammation to a host of conditions beyond heart disease, including diabetes, cancer and autoimmune diseases. They've discovered that chronic inflammation tends to increase with age and is critical in the development of many of the conditions we associate with getting older, like arthritis and sarcopenia (a gradual loss of muscle tissue). So connected are aging and inflammation that experts coined a new term, "inflammaging," to describe it.

But at the same time that science has uncovered the role of inflammation in causing harm, it has also shown us many powerful ways to fight back to help quell unwanted inflammation without suppressing the protective functions our bodies need. Research is showing that the foods we eat—or don't eat—can make a big difference, by contributing inflammation-fighting compounds and helping us manage our weight. Here are a few proven ways you can tame inflammation by shifting your eating habits.

A first step in managing chronic inflammation, as with so many other so-called diseases of lifestyle, is a varied and nourishing diet. To a large extent, we already know what that looks like, thanks to a great body of research that has identified some of the world's healthiest dietary patterns. Across the world, people living in "blue zones"—from Ikaria, Greece, to Okinawa, Japan—tend to live longer, healthier and happier lives. Though the foods they eat and the ways they prepare them differ greatly, they share a common dietary thread of getting most of their foods from plants: fruits, vegetables, beans, legumes and whole grains.

If that pattern sounds familiar, it should. Some of the diets most recommended by today's nutrition experts—including the Mediterranean diet and DASH (Dietary Approaches to Stop Hypertension)—have plants at their core. Not surprisingly, people who follow these plant-forward dietary patterns tend to have lower rates of inflammation.

WHY IS PLANT-BASED EATING SO PROTECTIVE? For one, plants are a key source of antioxidants, which can help prevent or delay the damage that inflammation can cause in our cells and tissues. Inflammation is largely triggered by oxidative

WORKING MORE PLANT-BASED FOODS INTO YOUR DIET CAN HELP KEEP CHRONIC INFLAMMATION IN CHECK.

stress—the production of reactive oxygen species ("free radicals") that occurs as our body metabolizes oxygen. Antioxidants can serve as an off switch to this process by neutralizing free radicals and breaking a chain of reactions that lead to cell damage.

Plants are also our sole source of both soluble and insoluble fiber, which have proven to be powerful inflammation reducers. Studies show that people who eat diets rich in fiber tend to have lower levels of inflammatory factors in their blood. Fiber also fights inflammation by supporting a healthier microbiome, feeding the beneficial bacteria living in the gut. And because obesity is associated with inflammation, fiber's ability to aid weight loss is another reason it helps manage inflammation; it helps slow digestion and keeps us feeling full longer, making it easier to eat fewer calories.

Another way to fight inflammation with what you put on your plate is to choose foods rich in omega-3 fatty acids, such as fatty fish, avocados, nuts and seeds. Research suggests that omega-3s can help interfere with the production of some of the substances released in the body's inflammatory response.

What you don't eat, of course, can also help keep your body in an anti-inflammatory mode. It's a good idea to minimize your intake of red meat, especially processed meat. Both can stoke inflammation, due to the saturated fat they contain, which can stimulate the production of pro-inflammatory compounds. Processed meats in particular are a source of advanced glycation end products (AGEs), inflammatory compounds that are produced in some foods when cooked at high temperatures.

Dietary guidelines urge us to limit added sugars in our diets—and avoiding inflammation is on the list of reasons to cut down on them. Many studies have linked excessive sugars to increased inflammation and the conditions that can follow, from obesity, heart disease and diabetes to metabolic syndrome. One mechanism may be the excess fructose that a sugar-rich diet can contain, which can cause inflammation in the cells that line blood vessels, contributing to the risk of heart disease and other conditions.

Limiting your intake of processed foods, particularly ultra-processed foods, such as microwave meals, chips and other convenience foods, can also help reduce your risk of chronic inflammation. Evidence suggests that processed foods, which tend to be more calorie-dense and nutrient-poor and easy to overeat, are associated with greater levels of inflammation in the body.

Building your diet around inflammation-fighting foods is easy—and luckily, it makes for some delicious eating, as the recipes in these pages show. First and foremost, it means getting plenty of vegetables and fruits. The USDA's Dietary Guidelines recommend getting at least 1½ cups of fruit and 2 to 3 cups of vegetables daily, depending on age, gender and overall health, and to combat inflammation, it makes sense to aim for the higher end of that spectrum.

When you're choosing produce, be sure to opt for a colorful variety. The pigments in plants that give them their colors, from red cabbage to blueberries to deep-green collards, are packed with antioxidant-rich polyphenols and the antioxidant vitamins C and E, all of which can help stop inflammation in its tracks. Consuming a wide variety will make sure you're getting a full complement of the nutrients and fiber your body needs.

Make an effort to embrace whole, unprocessed foods as much as possible, and opt for whole-grain versions of breads, cereals, pastas and other grain foods, which are easy to find in supermarkets these days. Swap out some animal-based proteins for plant-based ones—say, putting rice and beans or a tofu stir-fry on repeat when you're planning your weekly menus.

If you're a fish eater, aim for two servings each week—or get your omega-3s the vegetarian way, by incorporating a handful of nuts, a tablespoon of ground flaxseed or a few slices of avocado into your daily eating. Skip sugar-sweetened drinks and make desserts an occasional treat rather than everyday occurrences. And enjoy your daily cups of coffee or tea, both of which are important sources of antioxidant phytochemicals.

This prescription for anti-inflammatory eating doesn't sound like medicine at all, does it? People all over the world have been following these healthy patterns for ages, and you can too. ●

FIBER, WHICH CAN COME FROM WHOLE GRAINS OR PRODUCE, CAN HELP LOWER LEVELS OF BODY-WIDE INFLAMMATION.

CHAPTER 1

UNDERSTANDING INFLAMMATION

When natural inflammation becomes chronic, your immune response can cause damage throughout your body.

A SYSTEMIC RESPONSE

A healthy immune function that gets chronically triggered can cause any number of ailments. Here's how and why inflammation happens, why it is dangerous, and simple lifestyle tips to keep your risk factors in check.

BY HOLLY PEVZNER

Inflammation is a hard concept to get your head around. After all, doctors aren't exactly in the habit of handing out inflammation diagnoses. There's no American Inflammation Society. There are no walks to raise money for inflammation research; there's no special colored ribbon to honor those who are suffering. Still, a 2019 report in the journal *Nature Medicine* noted that disease related to chronic inflammation is the most significant cause of mortality today, accounting for half of all deaths worldwide. The researchers stated that prevention, early diagnosis and treatment of severe chronic inflammation would greatly reduce those numbers.

But how do we go about preventing a condition that so many of us still don't really understand? The answer: we learn more. Here, what you need to know.

Inflammation Starts Off as a Positive

The word "inflamed" brings thoughts of red, fiery ire. And that, in a nut, is inflammation. While it sounds menacing, "inflammation in small amounts is a good thing. We need it," says Monica Aggarwal, M.D., director of integrative cardiology and prevention at the University of Florida in Gainesville and co-author of *Body on Fire: How Inflammation Triggers Chronic Illness and the Tools We Have to Fight It*. With acute inflammation, your body is angry at an invader, like an infection, a sprain or a cut. In retaliation, platelets are sent to get rid of the invader, followed by white blood cells that swoop in and "act as the cleanup crew, sweeping up debris, such as bacteria, toxins and broken proteins from damaged tissues," explains Vivian P. Bykerk, M.D., a rheumatologist at the Hospital for Special Surgery in New York City. There will be redness, swelling,

warmth and pain, which are signs that your body is fighting a bad guy and trying to protect you. The scab crusting over your cut? Inflammation. The egg on your forehead? Inflammation. That midwinter sore throat? You guessed it: inflammation. All these reactions quite literally "wall off your injury or infection to allow mobilized cells to foster healing," says Dr. Bykerk. Heck, prior to antibiotics, this natural process was all we had to aid our recovery.

When Inflammation Goes Awry

"The chemical messengers that communicate acute inflammation are no different than those that communicate chronic inflammation," says Jeanette Bennett, Ph.D., associate professor of biological and health psychology at the University of North Carolina in Charlotte. "It's more about the amount of messengers sent and length of time they're activated." Helpful, acute inflammation is in and out, healing ouches, injuries and infections in about three to five days. With chronic inflammation, however, our well-oiled adaptive immune system misfires and our white blood cells (aka leukocytes) start to release large amounts of chemical messengers collectively called pro-inflammatory cytokines. These chemicals aggressively usher out "invaders" that aren't invaders at all. "With this misdirected attempt at repair and healing, our healthy tissue starts to break down," says Dr. Bykerk. This fruitless fight gets stuck in a seemingly endless loop in which inflammation causes damage to tissues in the body and that damage spurs further inflammation, and on and on. And that's called a chronic inflammatory response.

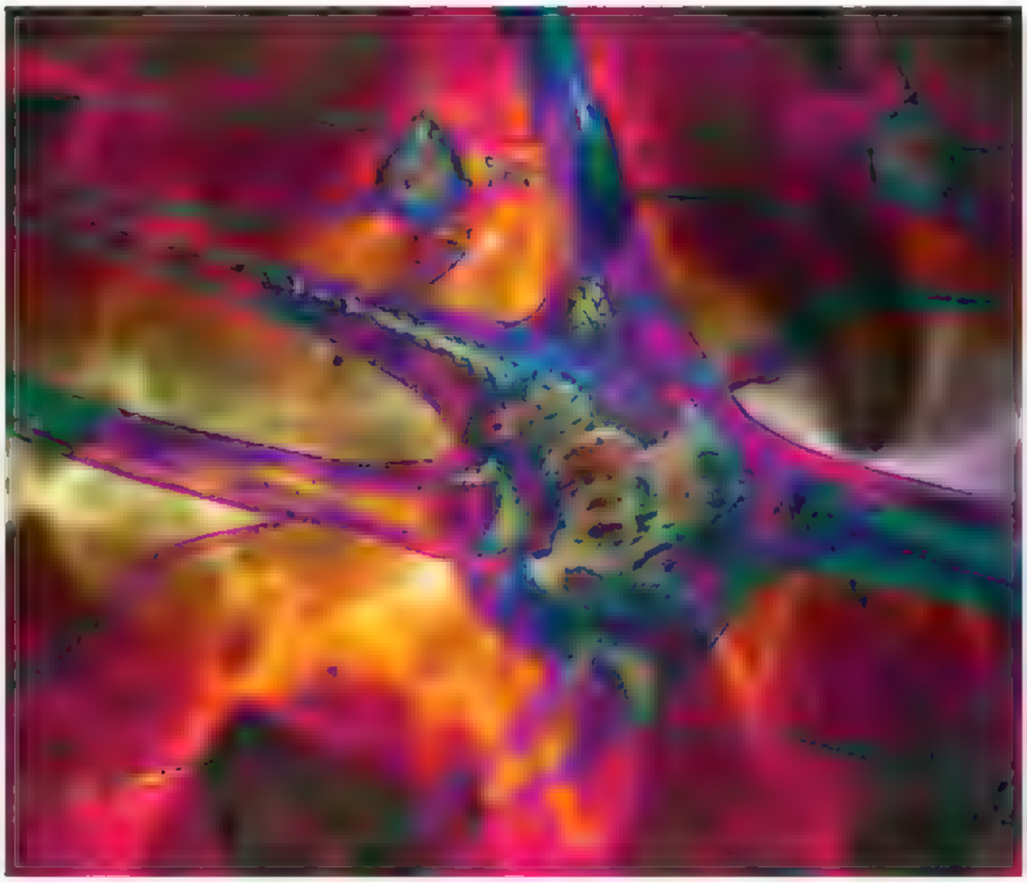
What "Disease" Is Inflammation, Anyway?

OK, so chronic inflammation isn't one specific disease. Your doctor wouldn't say, "You've got inflammation." Instead, she might say that you have cardiovascular disease or inflammatory bowel disease or rheumatoid arthritis. That's because chronic inflammation "is a factor that's linked to the development or worsening of these—and numerous other—diseases and conditions," says Bennett. For instance, as many as 1 in 5 cancers is believed to be caused or influenced by inflammation, according to researchers in the department of biological engineering at the Massachusetts Institute of Technology in Cambridge. In fact, most acute and chronic diseases result from inflammation, noted a 2018 study in the journal *Frontiers in Medicine*. This means that conditions like Alzheimer's disease, obesity, heart disease, cancer, stroke, chronic respiratory diseases, asthma, allergies, chronic kidney disease, inflammatory bowel diseases, autoimmune diseases and more all fall into the giant bucket of chronic-inflammation-related disease. In addition, the aforementioned *Nature Medicine* study noted that mental health problems, including anxiety disorders, depression and schizophrenia are also associated with chronic inflammation.

"And then there's the issue of comorbidities," says Bennett, meaning that once you've got inflammation, there's a high probability of having another disease or condition. "When the body's normal functioning is disrupted in one area, it places stress on the functioning of other bodily systems." For example, people with inflammatory forms of arthritis, like rheumatoid arthritis, are up to twice as likely to develop cardiovascular disease than those without.

Are We All Susceptible to Chronic Inflammation?

The short answer is yes. "Our bodies naturally shift toward an increase in inflammation with age," notes Elizabeth Bradley, M.D., medical director of Cleveland Clinic's Center for Functional Medicine. The longer we're on this earth, the more exposure we likely have to substances and situations that spur inflammation. In addition, gene regulation becomes impaired during the aging process, which tends to overactivate several key immune-to-brain communication factors. This, in turn, nudges the aging population into a more pro-inflammatory state, according to a 2019 report in the journal *Aging and Disease*. We also have a propensity toward weight gain with each passing year. "With that comes an increase in adipose tissue, which is inherently pro-inflammatory," says Dr. Bradley. (Adipose tissue, or body fat, is now well recognized as a major culprit in chronic inflammation, according to the *Aging and Disease* report.) That said, we are not all destined to face chronic inflammatory diseases. "I have patients in their 70s who feel great and are in



good health because they have a healthy lifestyle—they eat well, they exercise—and they're not doing anything to fuel the fire of inflammation," says Dr. Bradley.

So What Causes the Initial Misfire?

There are multiple reasons why our body's inflammatory response goes haywire. For instance, when an infection lingers in the body for an extended period, as in Lyme disease and hepatitis B or C, the immune system may continue to attack, sparking far more inflammation than is needed. "Things like toxin exposure, genetics and gene mutations also play a role in how or if chronic inflammation occurs," says Dr. Bykerk. Meanwhile, some of the biggest drivers of chronic inflammation are things like "stress, poor diet, lack of sleep, obesity, physical inactivity," says Dr. Bradley. But it's never just one thing. With inflammation, there's always an interplay between factors like genetics, environment and diet. What triggers, say, your misfire is different from what may trigger another person's. And predicting it isn't easy. "We don't know when exactly the body goes from a healthy, well-regulated state to a pro-inflammatory state," says Bennett. "Is it a slow progression, or does a switch get flipped? We don't know yet."

People often learn something is amiss only after they're diagnosed with a chronic-inflammation-related condition.

How Does Inflammation Decide Where to Attack?

How and where inflammation takes hold are not always intuitive. Depending on the individual, inflammation can strike in, say, your arteries, your joints, or the cells in your brain—almost anywhere—igniting any number of conditions. Sure, there are some instances when it's easier to connect the dots than others. For instance, the chemicals that smokers inhale into the lungs may trigger inflammation that causes chronic obstructive pulmonary disease. "That's a direct attack," says Dr. Aggarwal. "Smoking directly affects inflammation in the lungs because those toxins are bad for that specific part of the body." But smoking-associated inflammation can cause damage throughout the body as well. For example, chemicals in cigarettes activate particular white blood cells called neutrophils that, in turn, release molecules that lead to increased inflammation, according to a 2016 report in the *Journal of Leukocyte Biology*. And those neutrophils are a vital factor in the development of atherosclerosis, which is plaque buildup on artery walls.

Will the inflammatory response set off by cigarettes have the same impact on all who smoke? No. "Our genetics greatly influence how exactly inflammation will affect our health," says Elizabeth W. Boham, M.D., R.D., medical director of the UltraWellness Center in Lenox, Massachusetts. For instance, if you're genetically predisposed to, say Crohn's disease, your trigger, whatever that is, will activate the gene response to Crohn's. "At least that's what we think happens," says Dr. Aggarwal, who's own chronic inflammatory condition, rheumatoid arthritis, didn't surface until the mental and physical stress of having her third child provoked it.

What Are the Signs of Chronic Inflammation?

Here's the kicker: "There are no classic signs of early chronic inflammation," says Dr. Bykerk. The symptoms are, well, vague. Think body aches, fatigue, changes in mood, brain fog, constipation, heartburn, weight gain. "I have patients in their 40s and 50s who say things like, 'I ache because I'm old,' and I'm like, 'No, that's not it!' They have no idea that they're inflamed," says Dr. Bradley. "They don't realize that they shouldn't ache at all." Instead, people often learn something is amiss only after they're diagnosed with a chronic-inflammation-related condition.

There are tests that you can take, but they may not be as helpful as you'd think. "We use high-sensitivity CRP [C-reactive protein] testing with cardiovascular disease and CRP testing with autoimmune diseases to measure inflammatory markers," says Dr. Aggarwal. "In these situations, we have the data to support their use." For instance, there are specific levels of CRP that correspond to heart disease risk. You're at low risk of developing cardiovascular disease if your hs-CRP level is below 1.0 mg/L. You're at high risk if your level is

IT IS RECOMMENDED THAT ADULTS GET AT LEAST 150 MINUTES OF MODERATE-INTENSITY EXERCISE A WEEK.

YOGA CAN HELP REDUCE STRESS BY REGULATING THE NERVOUS SYSTEM.

above 3.0 mg/L. "But there's not enough data yet to support the use of this test in other areas," says Dr. Aggarwal, noting that there's far too much variability in CRP levels to make the test useful as a general screen. "Consider it this way," she says. "The test is just one marker. You may have totally normal CRP but have another inflammatory marker that we just haven't learned about yet." Or your CRP may be high because you've got a respiratory infection or gingivitis, which temporarily bolsters your numbers. "Ultimately, it's always better to fall back on risk factors to see if you have a higher chance for inflammation," says Dr. Aggarwal.

Before diving into what habits are putting you at risk, it's smart to first look at balance. "Think about it as what you give your body versus what you take from your body," says Dr. Aggarwal. "Say you have poor sleep habits, you're sedentary, and you smoke. Those are all stressors on your body." Compare your personal stressors to what you offer your body as resources, such as practicing yoga and eating healthy. "If there's an imbalance between what you take and what you give, that can trigger inflammation," she says.

Excess weight is a major driving factor for chronic inflammation. "Over 40% of Americans are overweight or obese, and about that same amount are chronically inflamed," says Dr. Bradley. "There's a reason for that." Adipose tissue releases inflammatory chemicals, and it reduces the production of adiponectin, a protein that has anti-inflammatory properties. (While excess weight drives inflammation, inflammation also drives weight gain, making this an especially vicious cycle, according to a

2019 study in the journal *Metabolism Open.*) Overall obesity can trigger inflammation, but belly fat is notably dangerous on its own, predisposing folks to the likes of heart disease, type 2 diabetes, insulin resistance and more. A 2020 report in the *Journal of Clinical Investigation* even connected belly fat to Alzheimer's disease; it noted that this type of fat overactivates microglia, which are immune cells in the brain, increasing brain inflammation and one's risk for Alzheimer's.

Chronic stress, no matter where it is coming from, is stress that occurs every day, all day, for many weeks or maybe months or years. With it, the so-called stress hormone cortisol is present at high levels for an extended period, which the body will begin to perceive as a threat. "What ends up happening is immune cells start to become activated, and once they are activated, there's very little opportunity to turn it down," says Bennett, who notes that chronic stress and its effects vary from person to person. "Your personal ramifications are linked to your coping skills, resources and ability to adapt."

When you're working on a sleep deficit, the hormone cortisol breaks down more slowly. "Therefore, when we don't sleep, cortisol remains at a higher level. And high levels of cortisol over time lead to inflammation," says Dr. Aggarwal. To wit: people who experience poor sleep quality or insomnia have increased levels of pro-inflammatory markers in their systems, according to a 2016 meta-analysis featured in the journal *Biological Psychiatry*.

What you eat also has a huge impact when it comes to chronic inflammation. Typical pro-inflammatory foods include red and processed meats; refined carbohydrates, such as white bread and packaged snacks; fried food; and sugar-sweetened beverages. "Some of these foods result in a change in blood sugar, which leads to inflammation. Other foods drive inflammation based on a shift in the microbiome," says Dr. Boham. Regardless of the hows and whys, consuming a pro-inflammatory diet is linked to higher circulating pro-inflammatory chemicals and lower anti-inflammatory chemicals. And the results can be dangerous. For example, a recent large-scale, long-term study in the *Journal of the American College of Cardiology* found that folks who consumed the most pro-inflammatory diets had a 38% increased risk of developing cardiovascular disease compared with those who had the most anti-inflammatory diets. And it's not just about poor diets leading to more pounds: a 2018 study in *JAMA Oncology* found that a pro-inflammatory diet increases one's risk for colorectal cancer, even in lean women.

"Right now, almost half of our society is chronically inflamed—and it's happening earlier and earlier," says Dr. Bradley. But there's a lot of hope. "People can 100% bring down chronic inflammation," says Dr. Aggarwal. "I did."

For seven years, Dr. Aggarwal has been off medications for her rheumatoid arthritis, thanks to things like tweaking her diet and finally finding time for herself. "I can't change my genes, but I can change how my body expresses and responds to those genes," she says. "Today, my inflammatory markers are totally flat. I took the time to heal my body, and I'm doing so much better. Other people are getting better too. It's possible." ●

EIGHT SNEAKY SIGNS YOU COULD HAVE INFLAMMATION

Turns out, your stiff joints or your "hangry" hankerings could stem from a deeper issue.

BY CAROLYN WILLIAMS, PH.D., R.D.

What are the signs of low-grade, chronic inflammation? Unfortunately, there's not a clear-cut checklist, and the reason stems from the fact that early symptoms are subtle, vague and often something you could attribute to a variety of causes. Yet it's important to be aware of potential signs so that initial chronic inflammation doesn't stick around to push the body toward a more serious health issue. Here are eight sneaky signs that you may have inflammation—plus what to do about it.

1. Your Joints Hurt or Are Stiff

A little tightness or tenderness in muscles and joints following changes to workouts or daily activity is normal, and it's a healthy type of inflammation that dissipates. What's not so normal is subtle pain and stiffness that continues (and that you can't trace to anything specific).

Joint pain may be one of the first signs of chronic inflammation caused by a variety of things. It can also be a sign of an autoimmune condition, such as rheumatoid arthritis, lupus or gout, caused by an overtaxed immune system releasing unnecessary inflammatory chemicals. Try reducing key inflammatory foods for some pain relief, and consider seeing a health care professional if it continues.

2. You Keep Forgetting Things

Feel like you're more forgetful or can't remember things as well? Memory and cognition decline slowly as we age, but research suggests that higher inflammatory markers in the body lead to a decline that's 8% to 12% greater.

It also appears that this decline starts in middle age. This means reducing inflammation early might impact memory loss later, so don't blow off those memory lapses if they seem to be occurring more than normal.

3. You Don't Feel Like Yourself

Does something feel off? Low-grade inflammation causes changes in neurotransmitter activity and brain functioning, which research suggests make the brain more susceptible to depression. Inflammation may also prevent antidepressants from working as effectively in some individuals.

This means that signs of depression—new onset or changes in severity—often signal some level of inflammation. Looking for ways to reduce inflammation while also seeking professional help is a good idea for your mental and physical health. Check out the tips on page 48 to support mental health through diet.

4. You Have New Digestive Issues

Occasional digestive issues are normal, particularly when you deviate from your usual food intake or schedule. But a digestive issue, such as bloating or diarrhea, that keeps returning isn't something to dismiss, since it may be a sign of inflammation.

The digestive tract is often one of the first places inflammatory signs are seen, and this is because of the role that good bacteria play in creating a protective barrier between what we digest and the rest of the body. When that process gets disrupted, inflammatory compounds have an easier time entering the bloodstream, triggering digestive issues and ongoing inflammation.

5. You Always Seem to Catch What's Going Around

Chronic inflammation is an unhealthy and abnormal immune reaction that leads to an overstimulated and overworked immune system. As a result, when you come into contact with bacteria and viruses, the body may not be as equipped to fight them off and you may find yourself more susceptible to catching that cold everyone seems to have.

To keep the immune system functioning at its

TOMATOES AND THE COMPOUNDS THAT GIVE THEM THEIR RED HUE CAN HELP REDUCE BLOOD PRESSURE.

best, look for ways to reduce chronic inflammation (and remember that this includes things like maintaining a healthy diet, managing stress and getting adequate sleep).

6. Your Blood Pressure Is a Little Higher

Small increases in blood pressure are something to stay on top of, since they may be early signs of chronic inflammation. This is because low-grade inflammation is considered a primary force in the development of hypertension, which can damage and stiffen blood vessels. Watch your numbers, look for ways to decrease stress, keep tabs on sodium and choose more anti-inflammatory foods to help manage blood pressure.

7. You Get "Hangry" Frequently

That irritable, low-blood-sugar feeling stems typically from an intake of refined carbs and sugar. But it's also a sign that the body is unable to adequately manage glucose, which can signal underlying inflammation. The reason is that chronic inflammation causes cells to become insulin resistant, which leads to higher blood glucose and disrupts healthy glucose management, increasing the risk for type 2 diabetes.

If you feel hangry frequently, look first at what you're eating: increase fiber, decrease added sugars, swap refined grains for whole ones and incorporate more anti-inflammatory foods. Keep tabs on your blood sugar, and definitely mention the frequency of those hangry moments the next time you see your doctor—particularly if you have a family history of diabetes.

8. You've Got a New Skin Irritation That Won't Go Away

Ongoing skin issues may be a sign that the body is inflamed. Chronic inflammation is the result of an overworked immune system, and it creates a low level of ongoing irritation within the body. This can make the body hypersensitive to things it may ordinarily not react to, and skin irritations may be one way that you see this.

Some skin conditions, such as eczema, are often caused by the immune system not working as it should. Talk to your doctor to rule out any medical issues. ●

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THE WEIGHT CONNECTION

Obesity and chronic inflammation can combine to create a cycle that makes it even more challenging to lose weight. Here's how that intersection works and some straightforward nutritional tips for maintaining or reaching a healthy weight.

BY EMILY JOSHU

If you've put on more than a few pounds, chances are that the cause is deeper than eating too much junk food or skipping one too many workouts. Chronic, low-grade inflammation that swells in the body may be to blame for this gain. And the relationship is cyclical. Weight and inflammation go hand in hand, and working to maintain a healthy weight through diet, exercise, sleep and stress management can help tame inflammatory markers.

Inflammation comes in two varieties: acute and chronic. Most of us are accustomed to acute inflammation, such as after sustaining an injury. This temporary response doesn't serve as a catalyst for serious health problems. It actually protects the body.

Chronic inflammation manifests as a slow burn in the body. "Inflammation is designed so once your body needs some healing, inflammation rushes in, but it's supposed to be only short term. Chronic inflammation is more subtle, and it's caused by irritation in the body," says Carolyn Williams, Ph.D., R.D., author of *Meals That Heal*. "And that may be environmental things, that may be food-related things, that may be stress, that may be lack of sleep. Just about any kind of irritation to the body can trigger subtle inflammation." Williams compares chronic inflammation to a fire in the body that will continue to grow without intervention. Research suggests that reducing chronic, low-grade inflammation may even be as crucial a component as diet and activity. And the relationship goes both ways. "Among people who are overweight or obese, immune cells start to infiltrate that fatty tissue. That in itself is thought to be part of what drives that chronic inflammation," says Caroline Childs, a lecturer in nutritional sciences at the University of

Southampton in the U.K. "So people who are overweight or obese may be more likely to be experiencing chronic inflammation. Whether that is causing them to gain weight or a result of having gained weight is a bit hard to unpick." A 2018 study in the journal *Clinical Nutrition*, for example, found that weight loss in obese and overweight subjects "is a determinant factor for reducing the level of pro-inflammatory markers."

Leptin is one significant influence in this cyclical relationship between weight and inflammation. High levels of chronic inflammation can detrimentally increase leptin in the body. A hormone released from the body's fat cells, leptin communicates with the hypothalamus to regulate food intake and energy use. Since leptin comes from fat cells, it is directly related to body fat. Sometimes referred to as the "satiety hormone," leptin inhibits hunger and regulates the body's energy balance, which keeps you from feeling hungry when your body doesn't need any energy. Someone who is obese, however, will have too much leptin in their blood, which can cause an aversion to the hormone in what is known as leptin resistance. This, in turn, makes the body want to keep eating. "So your body isn't getting proper feedback about appetite and when to stop eating and when you're satisfied," Williams says. Levels of leptin that result from weight loss can also increase appetite and cause more food cravings, which can make further weight loss more difficult. Excess leptin in obese individuals is considered a contributor to low-grade, chronic inflammation. This can lead to higher susceptibility to chronic conditions, such as cardiovascular disease, type 2 diabetes and autoimmune diseases, such as rheumatoid arthritis. Leptin joins with weight and inflammation to form a damaging cycle.

Consider swapping out red-meat proteins for lean picks, such as chicken and fatty fish, particularly salmon.

Inflammation and weight gain also work together in influencing the body's insulin response. A 2018 study in the *Journal of Clinical Investigation* found that insulin resistance promoted body-fat inflammation in mice. The researchers stated that there is a "chicken and egg" relationship between insulin resistance and inflammation in that "obesity induces insulin resistance . . . which in turn promotes inflammation." This can increase the symptoms and severity of type 2 diabetes. "The problem is that they both fuel one another. Weight gain causes more insulin resistance, insulin resistance causes more weight gain, and then inflammation is at the root of all of them. It's almost like they're just cyclical and build on one another," Williams says.

Sudden or unexplained weight gain, however, might be caused by inflammation in the thyroid, a butterfly-shaped, hormone-secreting gland located at the front of the neck that influences metabolism, growth, development and body temperature. If the thyroid becomes inflamed, the result is a condition called hypothyroidism, a slowing of the metabolism that causes sudden weight gain. "Your thyroid is going to control a lot of those hormones that affect your metabolism, so any time you have changes in your weight and changes in inflammation, they both alter your hormone fluctuations and the proper balance that all of those are supposed to be in," Williams says.

When it comes to losing weight and taming inflammation, your diet is a crucial factor. "An anti-inflammatory eating approach really benefits everyone, but it should definitely be a component of the way you eat if you're trying to lose weight," Williams says. So how can you ready your plate to fight back against inflammation? Add some color. This includes dark, leafy greens, such as spinach and kale, and vibrant fruits, such as tomatoes, berries and oranges. Additionally, consider swapping red-meat proteins for lean picks, such as chicken and fatty fish, particularly salmon. "Oily fish or omega-3s are the best-understood anti-inflammatory foods," Childs says. "If as individuals we can aim toward eating oily fish once or twice a week, that would be beneficial." Not to fret if you're vegetarian; Childs recommends algae as a plant-based source of these healthy omega-3s. To implement healthful carbohydrates, try using whole-grain bread for your sandwiches or whole-grain pasta with a low-sugar sauce.

Recent research highlights these anti-inflammatory foods as key factors in healthy weight management. A recent study in the *European Journal*

ANTI-INFLAMMATORY EATING DOESN'T HAVE TO BE EXPENSIVE. FRUITS AND VEGETABLES ARE AN AFFORDABLE AND HEALTHY CHOICE.

of Nutrition, for example, examined the effect of a legume-based, low-calorie diet on inflammation in overweight and obese participants. The researchers found that consuming four servings of legumes per week reduced inflammatory markers and therefore improved metabolism in the subjects. Additionally, a 2014 review in the *Journal of Agricultural and Food Chemistry* discussed that eating whole fruits and whole fruit products has been shown to mitigate inflammatory markers in some studies. These foods fall in line with the popular Mediterranean diet, which emphasizes fruits, vegetables, whole grains, beans, legumes, herbs and spices. It also highlights plant-based and lean proteins.

Childs acknowledges, however, that healthy picks, such as salmon and kale, might not be financially accessible to everyone and recommends more affordable options, such as carrots, peas and apples, to achieve the same anti-inflammatory benefits. All these whole foods have similar anti-inflammatory effects. "Focus on getting your calories from real foods," Williams emphasizes, also pointing toward low- and moderate-carb diets that target excess weight and inflammation. These foods and eating patterns can also help balance insulin and glucose levels.

And controlling weight and inflammation isn't just a matter of what you eat; other lifestyle changes have the same close relationship as food to weight loss. "What we're realizing is we tend to think weight is just related to food, but weight loss and inflammation, both are whole-body approaches," Williams says. Williams points to psychological aspects, such as sleep, stress and exercise, as influences for weight control. Lack of shuteye is one of the most common factors; the Centers for Disease Control and Prevention estimates that 35% of adults don't get enough sleep—at least seven hours per night.

Though a revamped plate and lifestyle changes can decrease harmful inflammation in the body, you still need small amounts of acute inflammation, such as in response to a sprained ankle. The goal is to avoid getting too much of a good thing. "A little bit in the right place is a good thing. We don't want to turn it off completely," says Childs. "I think the challenge is finding the right balance." ●

CHAPTER 2

KEEPING IT AT BAY

By understanding how inflammation intersects with different aspects of your life, you can fight it off using some simple strategies.

WHAT DO DIETITIANS DO TO FIGHT INFLAMMATION?

Six experts reveal their daily approach to inflammation (and stress) management.

BY ISADORA BAUM

When it comes to fighting off chronic diseases, such as heart disease and diabetes, and simply feeling good day after day, reducing inflammation and stress in the body can significantly improve your outcomes. "Inflammation is an immune response by our body that is meant to protect us from intruders (like a virus) and heal us from injury and stress. When inflammation happens in response to something like a cut, it's a good thing and will help our body heal," says Kelsey Lorencz, R.D.N.

But when inflammation is chronic over a long period, the effects can be damaging. The immune system goes into overdrive and starts attacking healthy tissues as long as the stressor persists.

But everyone experiences some type of stress and inflammation—even dietitians. So we asked six dietitians what they do daily to combat it. Here's what they had to say. While inflammation can look different from person to person, the strategies are pretty much the same for everyone: minimize stressors and add behaviors that have been shown to reduce inflammation. So while there isn't one single thing that will make chronic inflammation disappear overnight, incorporating a combination of these dietitian-backed inflammation-fighting strategies can help improve your outcome over time.

1. Nosh on Cherries

"Cherries are a rich source of polyphenols and vitamin C, which have antioxidant and anti-inflammatory properties, with studies suggesting that consuming cherries may reduce the risk of several chronic inflammatory diseases, including arthritis, cardiovascular disease, diabetes and

even certain types of cancer," says Lauren Harris-Pincus, M.S., R.D.N., the author of *The Protein-Packed Breakfast Club*. "There is also evidence that cherries may improve sleep, cognitive function and recovery from pain after strenuous exercise." So throw some cherries into your morning yogurt or oatmeal, or drink tart cherry juice after a workout or before bed to get the inflammation-fighting effects of this juicy fruit.

2. Meditate

Meditation can be an incredibly effective way to decrease the amount of cortisol in the body. Lorencz explains: "Cortisol is a stress hormone that is released when we are in 'fight or flight' mode. If you are under a lot of stress (who isn't these days?!), your body can be releasing a lot of cortisol on a daily basis, leading to inflammation." Meditation can help you switch from "fight or flight" to "rest and digest" mode, which will decrease the stress hormones released and increase the body's ability to digest food, absorb nutrients and, in turn, better fight off disease, she says. "Headspace is a great app to use if meditation sounds intimidating or difficult," she recommends. If meditation isn't for you, another relaxing practice, like reading a book, going for a walk or listening to your favorite music, can also help.

3. Eat More Probiotics

"Having plenty of good bacteria in your gut creates an environment that allows for maximum digestion, absorption and utilization of all the nutrients you eat in a day," says Lorencz. Not only will a healthy gut make your body more efficient at utilizing anti-inflammatory nutrients from food, but also eating and drinking plenty of foods containing probiotics (think yogurt, kefir, kombucha and kimchi), as well as foods that help feed that good gut bacteria (like high-fiber whole grains, fruits and vegetables), can have systemic effects elsewhere in the body, says Lorencz. Add some kimchi to your brown rice and veggie bowl at dinner and make a fruit smoothie with kefir for a gut-healthy boost.

4. Get More Omega-3s

Omega-3 fats help fight inflammation and are found in foods like salmon, mackerel, flaxseed, chia seeds and walnuts. "Increasing these fatty acids in your diet or through supplements should be done in conjunction with reducing the intake of fats that increase inflammation [when eaten in excess]," says Rachel Caine, M.S., R.D., L.D.N., a dietitian for Baze.

Opt for plant-based oils, such as olive oil and canola oil, and lean protein, like chicken and beans, in addition to your omega-3 rich foods. Moderate your intake of foods high in saturated fat, like red meat and high-fat dairy (especially if you have diabetes or heart disease), and avoid eating too many fried foods that have been cooked in reheated oil. Reheating oil over and over again, which often happens in fast-food restaurants, can create inflammatory compounds.

5. Limit Alcohol Intake

"While red wine may have some health benefits, drinking multiple glasses every night is not recommended," says Monica Auslander Moreno, M.S., R.D., L.D.N., a nutrition consultant for RSP Nutrition. The recommended limit is one drink per day for women and two drinks per day for men—that's how much our bodies are able to successfully break down into a nontoxic substance.

So think twice before pouring a glass. "I used to just order a glass of wine or a whiskey—I love Japanese whiskey—automatically with a meal. Now I really think hard if I 'need' it, and that mindful process has led to me having a max of two or three per week," she says.

6. Embrace Plant-Based

You don't need to give up steak, but focus on eating more plant-based proteins, like beans, lentils, tofu and seitan. "Following a diet rich in plant foods will get you well on your way to getting the full complement of micronutrients and antioxidants, which are integral to healthy DNA replication, cell turnover and immunity," says Caine. Aim to go meatless for a few meals, and fill half of your plate with fruits and vegetables at each meal.

7. Form a Healthy Nighttime Routine

Give yourself time to power down, since inflammation increases with a sleep deficit. Moreno says, "It's really hard for me to 'turn off' at night with my buzzy thoughts, so I practice a 'coat check' approach—I check my nervous or random thoughts and anxieties at my bedroom door. And when they creep in, I banish them to the coat check."

She adds, "I allow myself to run through happy memories or cyclical thoughts—kind of like counting sheep, but for me it's thinking about nerdy things, like medieval history timelines, which relaxes me." Find a habit that works for you, whether it's shutting off your phone and TV an hour before bed, reading or having a cup of herbal tea before turning in for the night.

8. Eat the Rainbow

Add a pop of color to your plate by including a wide range of colorful foods. "I strive to get a variety of colors of produce in my diet. Chemicals that give plants their color contain antioxidants, which help fight off inflammation," says Diana Gariglio-Clelland, R.D., C.D.E. "Diets rich in antioxidants have been linked with lower incidence of cancers by fighting off cell damage." Including berries in oatmeal or adding dark leafy green veggies to dishes is a great way to get more antioxidants in your diet.

9. Add Spices

Feel free to use paprika, turmeric, cayenne, ginger, garlic and more! "While we often don't think of spices as providing much more than flavor, they have been found to be natural sources of antioxidants, which can help blunt some of the damaging effects of inflammation," says Hailey Crean, M.S., R.D., C.D.E. They won't cure you overnight, but eating more healthy herbs and spices can help over time.

10. Eat Fewer Inflammatory Foods

"I try to minimize foods associated with inflammation. Again, if you eat a hot dog, you don't automatically become 'inflamed,' but I do try to very rarely consume foods associated with inflammation," says Moreno. That means fewer hot dogs and other processed meats, fewer charred meats, less alcohol and less added sugar (including candy and soda). ●

BEDFELLOWS: LACK OF SLEEP AND INFLAMMATION

It may sound like a snooze, but better rest can help boost your immune system.

BY DAVID BJERKLIE

For a great many Americans—some 35% of us, according to the Centers for Disease Control and Prevention—getting a good night's sleep is just a dream, alas. The reality, according to survey after survey, is that the number of hours we spend sleeping has been shrinking in recent years. In fact, according to the CDC, this collective dearth of sleep is currently at epidemic proportions.

Moreover, we all have our own ways of coming up short on shut-eye. Some of us have erratic, unpredictable sleep; we might lose most or all of a night for various reasons. Others are more consistent but not in good ways; we seem to habitually experience shortened or poor-quality sleep. Toss in shift work, chronic health issues—physical as well as mental—recurring stress, even relentless nightmares, and you have the makings of a nation that can seem to be running on sleep fumes.

In addition to the obvious wear and tear of too little sleep—bad moods, fatigue, poor performance at school or work—we have the burden of being reminded by countless articles, books and sleep experts that restful, rejuvenating sleep is an absolutely essential, nonnegotiable element for good health. No pressure, right?

Well, the experts are right. But by more fully understanding why they are right, we can better face our sleep problems with potential remedies. One of the keys in this understanding is to appreciate the interconnection between sleep and our immune systems.

Most of us now know that sleep is not a passive state and that there are different types of sleeping states in which both the body and the brain are active. It's a good thing to remember if we

find ourselves lamenting the fact that we spend so many of our hours seemingly dead to the world; by age 70, the average person has spent a cumulative total of between 20 and 25 years asleep. In fact, the physiological "work" done during sleep may be why our need for sleep survived mammalian evolution, despite the potentially vulnerable state in which it places us. Some of the most important work that is done while we're asleep involves the immune system.

The link between sleep and immune function is complicated. As sleep expert Michael Breus, Ph.D., notes, "In talking to my patients, I realize that while most of them understand that excessive inflammation can be harmful . . . they don't know that poor sleep is a contributor to inflammation." It is a two-way street, explains Breus. "The relationship between inflammation and sleep brings together two complex and fundamental body systems." Not only are sleep and the immune system dependent on each other for optimal health, but it's a feedback system in which problems in one system can be either cause or effect in problems with the other.

There are chemical markers that reflect the interaction between sleep and inflammation—such as C-reactive protein, or CRP, a molecule produced in the liver in response to inflammation signals. Poor sleep, in either quantity or quality, is often associated with an increase in CRP levels. It is also known that inflammation can be linked to a number of diseases, such as type 2 diabetes and heart disease. (Some research suggests that chronic sleep deprivation may double a person's risk of dying of heart disease.) Many experts are particularly worried by the public health ramifications posed by the relationship between poor sleep, inflammation and obesity.

The link between poor sleep and obesity is also an example of feedback loops that can make the problem worse. According to the Harvard Health Publishing report *Fighting Inflammation*, "With insufficient sleep, you produce higher levels of hunger hormones and lower levels of satiety hormones, causing you to overeat—in particular, you're likely to crave refined carbohydrates. It is also possible that fatigue may cause you to be less physically active, and thus miss out on exercise's weight-loss and anti-inflammatory benefits."

Poor sleep can also be part of the feedback loop in depression, according to *Fighting Inflammation*: "Depression shares many of the same characteristics, risk factors, and symptoms as immune-based inflammatory responses. We know that low mood, appetite loss, sleep disturbances, trouble concentrating, and a lack of energy are clear hallmarks of depression, but these are also signs of inflammation." Links between sleep disturbances and immune response have also been investigated in schizophrenia and alcohol dependence.

These relationships are made more complex by the fact that "sleep cycles, duration, and quality change significantly over a lifetime," wrote Norah Simpson, Ph.D., and David Dinges, Ph.D., more than a decade ago in "Sleep and Inflammation" in *Nutrition Reviews*. And as we age, it isn't just that we wake up at night more often and take more naps; there are "changes in numerous other domains of sleep," including "sleep architecture, circadian rhythms, and sleep pathologies," they say.

Moreover, says Breus, "the differences in the ways women and men respond to sleep loss are important and understudied. Sleep's effects over inflammation may be one area where women and men experience different degrees of consequence—and that could have implications for their vulnerabilities to chronic disease."

Sleep is important for fighting off microbial infections. It also plays a role in maintaining a healthy microbiome, explains Breus. "How does a gut become unhealthy? Poor diet, stress, medication and illness are all contributors. So too are disrupted circadian rhythms and poor sleep. Poor and insufficient sleep appear to change the composition of our natural microbiota, decreasing beneficial bacteria and increasing bacteria associated with disease."

As Breus emphasizes, the challenge is that inflammation often has no obvious symptoms. And while the sheer complexity of the sleep-immune interconnection may seem like the bad news, on the other hand, that may be the good news too. The complexity of the interconnection offers an enormous number of avenues and opportunities that we can take to contribute to our well-being.

Getting better sleep is a battle you can wage on several fronts. First, some general principles. Is your schedule overbooked? It happens to us all, but let your new motto be, When the going gets tough, don't tough it out. Instead, protect yourself (and your sleep) by sticking to a healthy sleep routine and reminding yourself that any short-term benefits from cutting back on sleep are, first, most likely illusory, and second, bound to backfire, usually sooner than later, though we tend not to notice it until too late. Real productivity thrives on sleep. And when you are feeling stretched thin, take advantage of as many coping strategies as you can, which might include naps or regular meditation to reduce stress.

There is also an ever-expanding range of technological innovations that can come to your aid. The past few years have seen an explosion in AI-powered apps that can gather and track a full spectrum of sleep data, down to the minute. There are smart alarm clocks that can simulate the light of a natural sunrise every morning; smart beds and even pillows that are loaded with sensors, pumps and vibrating panels designed to detect snoring and adjust accordingly; as well as sophisticated earbuds and white-noise machines that aim to soothe and headphones that aim to shut out all noise. All of which can help you be smart in knowing that a good night's sleep is also serving your immune system. ●

Five Ways Sleep and Inflammation Intersect

1. Sleeping well can work directly to keep inflammation in check by helping you avoid the pro-inflammatory activity that occurs in the presence of poor, dysregulated sleep, according to sleep expert Michael Breus, Ph.D. And sleep offers significant protection against stress, itself a major contributor to chronic inflammation—now a known pathway to disease.

2. Getting the right amount of sleep for you—for most adults, that's seven to nine hours a night—on a consistent basis is one way to help avoid low-grade, systemic inflammation that's associated with aging and chronic disease.

3. Our biorhythms thrive on consistency, says Breus. Going to bed at the same time and waking at the same time every day reinforces the healthy circadian rhythms that govern both our sleep and our immune function, including inflammation.

4. Healthy sleep and a balanced, thriving gut (see above for common threats to the gut) can work to limit harmful inflammation and may help deliver long-term protection against disease.

5. Along with improving your ability to function at your best mentally and feel your best physically, Breus says that getting a full night of restful sleep every night makes a difference at a cellular level, in your body's capacity to keep inflammation in check. *—David Bjerklie*

Exercises You Can Do at Home to Reduce Inflammation

You don't need to go to the gym to get the proven benefits of exercise. Here are five ways to get moving wherever you are.

BY JULIE JONES

Reducing inflammation continues to be a hot topic, and for good reason. Some inflammation is natural in the body—for example, it's your body's response to helping you heal a skinned knee or fighting off foreign invaders.

Chronic inflammation, on the other hand, can be problematic. It is often brought on by lifestyle choices and is a common contributing factor in many chronic diseases, such as diabetes, cardiovascular disease, arthritis, and even Alzheimer's disease.

The good news is that research suggests that even moderate exercise can lower the body's inflammatory response. And even better news is that many exercises can be done anywhere, even in the comfort of your own home! The key is to get moving. Here are five simple ways to exercise at home to reduce inflammation.

WALKING

Going for a walk is one of the most easily accessible ways to get exercise into your day. And according to a study on inflammation and exercise, even a 20-minute walk can lower the body's inflammatory response.

For the greatest benefit, go for a walk outside and combine the benefits of being in nature with the benefits of exercise. If you don't want to leave the house, dust off the treadmill that's been sitting in your basement and hop on for a 20-minute walk (or walk in place) while you watch your favorite show.

YOGA

Yoga is meditation in motion. Combining deep breathing exercises with gentle movements, yoga can help people lower their blood pressure, reduce anxiety, and even improve symptoms of depression. Pretty impressive, right?

Yoga can be done anywhere. While many people enjoy the community built by attending classes at a local studio, a quick Google search provides an almost limitless number of resources for online classes and tutorials. (YouTube also offers thousands of free videos to choose from.)

SEEK OUT GENTLE AND GRADUAL YOGA POSES IF YOU'RE A BEGINNER.

MOBILITY EXERCISES

Mobility exercises, including self-myofascial release (SMR), are a group of exercises that often use a foam roller. It's a complicated term, but when you think of SMR, think self deep-tissue massage. Utilizing a foam roller allows you to apply pressure to your muscles in the same way that a massage therapist would, but you can do it on your own time, at the gym or in your own home.

Research shows a significant increase in the range of motion of the joints and improved muscle function when SMR techniques are used.

Start with your calves and work your way up the back of your legs—from calves to hamstrings to glutes. Then move to the front of your legs—the muscles around the shins, up to the quads. Move to your back, rolling into your shoulder blades with your arms crossed over your chest.

Finally, finish by lying on the foam roller (lengthwise) vertically from your head to your tailbone. Keep your feet on the floor and allow your arms to drop out to the sides with your palms face up. This passive stretch opens the chest and gets our bodies out of the C-curve posture caused by sitting for long periods at a desk.

BODY-WEIGHT EXERCISES

Body-weight exercises are one of the best ways that we can build strength without putting additional stress on the joints by loading them with extra weight. In addition, research shows that resistance training can slow down the inflammatory response in older adults.

With all exercise, the key is to adjust the intensity relative to your ability. Try to work at a level that is moderately difficult for you for the majority of the workout, and include shorter intervals at a higher intensity. The talk test is an easy way to measure how hard you're working: if you can carry on a conversation, you're working at a low to moderate intensity; when it begins to be difficult to maintain a conversation, you know you've hit that higher-intensity threshold.

CYCLING

Nothing takes you back to feeling like a kid quite like riding a bike. And you don't have to go to a high-intensity spin class to see the benefits. Whether you decide to get outside and ride or you choose a stationary bike, research shows that cycling helps to alleviate inflammation.

Riding a bike is a great choice for people with joint pain and arthritis since it is low impact. Plus, cycling promotes range of motion at both the hip and knee. I've personally trained clients with knee replacements and ACL tears, and one of the ways we kept them moving prior to surgery and during recovery was by utilizing the stationary bike.

Try this format for your cycling:

Do a five-minute warm-up at an easy pace and low resistance. You should feel like you are having to work to move the pedals, but not like you are struggling to move them.

Cycle for 20 minutes at a moderate pace and resistance. Think of your intensity on a scale of 1 to 10, with 1 being no exertion and 10 being the most intense exertion you can imagine. Keep your pace and resistance between 5 and 7 for intensity. Cool down for five minutes at an easy pace and low resistance. ●

UNDER THE SKIN

Keeping inflammation in check means better health for your skin. Experts share the latest strategies.

BY LISA LOMBARDI

Your skin is your most visible organ, and when it's not happy, you know. Pimples, itchy dryness and reddish skin are tip-offs that there's an inflammatory response going on. Despite its bad press, inflammation is not always bad—it's how the body recovers from threats. But when it continues unchecked, it can become chronic and do damage to your skin, contributing to everything from accelerated aging to skin cancer.

Now for the better news: There are everyday ways to reduce local and systemic inflammation and protect your skin in the process. The way you eat and take care of your skin helps keep inflammation to a minimum. When our skin is facing an issue (a breakout, a sunburn, a rash, etc.), there's a localized inflammatory response, with puffiness and/or red or purplish skin. This is all part of the natural healing process. "Inflammation in the skin can be good sometimes," says Tsippora Shainhouse, M.D., a dermatologist based in Beverly Hills, California. "When you have an acute injury or infection, you need the inflammation reaction to help heal the skin and/or fight the bacteria or fungus." In fact, she adds, dermatologists sometimes try to induce mild inflammation to help regenerate the skin's collagen to minimize the appearance of premature aging (this is how microneedling, fractionated lasers and even topical retinoids work).

Ongoing inflammation of the skin—whether due to acne, rosacea, atopic dermatitis or some other reason—is another story. "Many of the conditions we see in the skin are characterized by inflammation," says Joshua Zeichner, M.D., associate director of dermatology at Mt. Sinai Hospital in New York City. "In acne, there is inflammation within

our follicles, leading to blockages and pimples. In rosacea, there is inflammation in our outer skin layer, leading to redness, burning and pus bumps. In eczema, there is inflammation in the skin, leading to disruptions in the outer layer with loss of hydration, dryness and flaking."

Recurrent acne flares or uncontrolled chronic skin conditions (atopic dermatitis, rosacea, etc.), as well as ongoing exposure to UV rays and air pollution, can lead to chronic inflammation, activation of enzymes that damage skin and the breakdown of structural collagen, which leads to premature skin aging. Inflammation that accelerates aging is called inflammaging, and it harms our looks and health because it makes our cells age faster than they should.

A fruit- and vegetable-rich pattern of eating cuts the risk of squamous cell carcinoma by 54%, according to research.

Ongoing systemic inflammation often shows up on the face. "The skin is the largest organ in the body, so it will manifest any gastrointestinal disturbances, intolerances and inflammation of the body as eczema, acne and psoriasis, among other skin issues," says Alexandra Salcedo, R.D.N., a clinical dietitian at UC San Diego Health in La Jolla, California.

But it's a two-way street. Your skin problems can trigger whole-body inflammation and put you at risk for other health issues. When the skin barrier is compromised and your body gets the message to heal it with an inflammatory reaction, there's a cascade effect that can set up a bigger inflammatory response. It may prompt your body to pump out cytokines and put your body in inflammatory mode. In fact, one study of older adults found that applying a simple moisturizer to itchy, dry, inflamed skin lowered their levels of cytokines.

So what steps should you take if you're suddenly seeing red (as in inflamed skin)? Here are a few ways to calm the irritated skin cycle:

Switch up your product. Finding the right skin helpers can involve playing detective and seeing if the products you're using are messing with you. "Redness, tingling, pain and itch do not mean that it is working," says Dr. Shainhouse. "It means that it is probably not the right product for your skin."

Soothe your inflamed skin. Try gentle moisturizers (such as Cerave, a perennial derm favorite), an over-the-counter 1% hydrocortisone cream for a few days, or a nonsedating oral antihistamine like Zyrtec if the inflammation is allergy-related, advises Dr. Shainhouse. If this isn't enough, see your dermatologist for the next steps.

Simplify your routine. Stick to a gentle cleanser, moisturizer and sunscreen. "If you see flaking, listen to what your skin needs and apply a moisturizer," Dr. Zeichner advises. And be sure to toss your face scrub. "Exfoliating already dry skin can make matters worse," he adds.

It's also wise to skip antiaging ingredients and trendy products until your skin is back to normal. "Then slowly add in one at a time, to make sure that your skin can handle them," Dr. Shainhouse says.

Eat to beat inflammation. Turns out, what we pile on our plates may show up on our faces. Some research suggests that low-fat dairy (skim, 1% and 2%) but not full-fat dairy may be associated with acne in teens and adults who were already predisposed to developing it, Dr. Shainhouse says.

Along those lines, foods high in added sugars (cakes, cookies, sports drinks) may also spell trouble for people already prone to acne. And there's some evidence that "simple sugars can lead to glycation of the collagen and elastin fibers in the skin, making them stiffer and less flexible, leading to premature skin aging and wrinkling," Dr. Shainhouse says. Thankfully, a skin-friendly diet looks a lot like a generally healthy diet. First, says Salcedo, "reduce and limit inflammatory foods, like refined sugars, refined baked foods, processed foods and excessive alcohol." Don't worry—you don't have to completely swear off treats, just cutting back will help. "If you occasionally consume a slice of cake or a home-baked cookie or two, your body will not suffer the negative effects that someone will who consumes a refined pastry every single day," she notes.

Overall, think plants. By adding a variety of colors to your grocery cart, you ensure that you're getting a full range of antioxidants—those natural, possibly cancer-fighting chemicals that give plant foods their colors. "Antioxidants may help lower inflammation by protecting your cells from free radicals,"

FIBER MAY HELP WITH INFLAMMATORY SKIN CONDITIONS LIKE RASHES AND ACNE BECAUSE IT HELPS REGULATE BLOOD SUGAR LEVELS.

Salcedo says. In particular, lycopene and polyphenols have been shown to guard against oxidative damage from the sun and reduce skin inflammation. In fact, a fruit- and vegetable-rich pattern of eating cuts the risk of squamous cell carcinoma by 54%, according to research, while an eating style rich in animal protein and dairy raises the risk of this common skin cancer.

Many foods are full of antioxidants, but here are some Salcedo likes to add to her cart: turmeric, cayenne pepper, ginger, garlic, dark chocolate, strawberries, blueberries, goji berries, beans, spinach, oranges and raspberries.

Meanwhile, scientists are finding that bacteria and other bugs may be the key to healthy skin. "The microbiome is the collection of natural microorganisms that live on our skin. When that microbiome is disrupted, either because of genetics or environmental exposures, the skin barrier can become compromised," explains Dr. Zeichner. "This translates to inflammation, irritation and a variety of skin rashes." Research is revealing that both skin and gut microbiomes play roles in many skin issues, including allergies, acne and eczema, adds Dr. Shainhouse. "This ongoing research may help us determine if we can prevent and/or manage certain conditions by tweaking the flora—the bacteria and yeast—on our skin and in our guts," she says.

While experts are still figuring out how to best do that, it can't hurt to consume plenty of probiotic and prebiotic foods. You'll get probiotics—live yeasts and bacteria—from fermented and cultured foods, such as tempeh, pickled vegetables, mozzarella and full-fat yogurt with live cultures. Prebiotics, on the other hand, feed your gut bacteria. Potent ones include garlic, onions and chickpeas. But prebiotics are found in almost all plant foods, so everything from your morning bowl of oatmeal to your post-workout banana helps nourish your good bacteria. And that just may help your skin. ●

WHEN STRESS INFLAMES US

Prolonged anxiousness can lead to chronic inflammation. Here's how the body responds to fear, and how to manage the response.

BY CAROLYN WILLIAMS, PH.D., R.D.

Stress is a normal occurrence that everyone experiences, and it is triggered by a stressor or perceived threat. Stressors can be events that are potentially life-threatening, like being chased by a bear or veering to avoid a car crash. But stressors can also be less dramatic, such as deadlines, difficult people, lack of sleep, financial worries and chronic pain. The reality is that anything that causes a person to question whether they have the ability to cope or manage—no matter if it's physical, mental, psychological, lifestyle-related or environmental—triggers some level of stress response.

Also known as fight or flight, the body's stress response is designed to protect and to help the body survive. When the body senses a threat or stressor, the nervous system elicits the fight-or-flight response, and the brain signals the endocrine system. This triggers the immediate release of adrenaline and an increase in cortisol. These two hormones speed up heart rate, breathing, reaction time and muscle contractions, actions that are all designed to almost instantaneously provide the resources the body needs to outrun a stressor or get it under control. Then the body slowly returns to normal—breathing and heartbeat slow, muscles slowly relax, and adrenaline and cortisol levels decline—as the stressor leaves or subsides.

The stress response is a good thing, even lifesaving at times, but that's when it works as it was designed: short, temporary and sporadic. Issues arise when the stressor sticks around and the stress response continues. While some may joke about stressors being aggravating or annoying, the stress response literally "gets under the skin" when it's ongoing or unmanaged. The effects cause dysfunction in the nervous and endocrine systems, leading to chronic inflammation, which can have long-term impacts on the body and brain.

The short-term impact of stress on the immune system is often seen in one's increased susceptibility to catching a cold or getting sick after a stressful time. The long-term effects from inflammation are harder to see, yet they are much more pronounced in the body. Most chronic diseases—including heart disease, diabetes, cancer and autoimmune conditions—are either triggered or exacerbated by low-grade inflammation primarily stemming from our lifestyle choices. Key lifestyle inflamers include a sedentary lifestyle, regular inadequate or restless sleep, smoking, stress and diets that don't minimize processed foods, added sugars and saturated fats, as well as diets that include an excess of calories, carbohydrates or alcohol.

Ongoing stress is particularly harmful when low-grade inflammation already exists, since it builds on what's already present. For example, a person who is overweight and not very active may also have some insulin resistance. All three factors—excess fat, inactivity and insulin resistance—suggest the presence of chronic inflammation. When ongoing stress enters the picture, it creates a cyclical inflammatory effect: elevated cortisol makes insulin resistance worse and increases appetite, and that leads to higher blood sugar and possibly weight gain. This, in turn, increases insulin resistance, weight and blood sugar, contributing to even more inflammation, demonstrating how an inflammatory storm is created and builds.

EVEN THOUGH MOST PEOPLE KNOW THAT PRACticing stress-management techniques is beneficial, it's easy to blow them off when you're pressed for time—or worse, stressed. However, it's important to find ways to destress on a regular basis because an individual's coping skills can help minimize stress's impact on the brain and body. Movement-related activities are typically some of the most effective ways to reduce stress, and there are three forms that research suggests can reduce inflammatory markers in the body.

Consistent, regular exercise—both moderate and high-intensity—not only reduces stress but also enhances the effectiveness of the immune system. Although exercise initially causes some acute inflammation during and right after a workout, research suggests that engaging in a long-term physical-activity program acts as anti-inflammatory therapy. Atlanta-based personal trainer and yoga instructor Julie Jones agrees: "Regular exercise helps manage stress overall, but even just a quick 10-minute walk or run has benefits and boosts mood by increasing serotonin function."

Serotonin is a neurotransmitter that stabilizes mood and improves outlook, including that associated with current stressors. Jones says that resistance training, when done at a low to moderate intensity, has been shown to be the most reliable form of exercise to reduce stress and anxiety.

Long, exhaustive episodes of high-intensity exercise, particularly when there is inadequate rest between them, can increase inflammatory blood markers and contribute to chronic inflammation. However, you can avoid this by not going overboard. Listen to your body and take a rest day when needed. You should feel a little tired after a workout, but also energized and refreshed.

Regularly practicing yoga can also significantly

reduce stress and inflammatory markers in the body. While that's largely thought to be due to the stress-reducing effects, yoga may also aid in reducing inflammation by helping the autonomic nervous system relax.

A 2015 study found that adults who had been practicing yoga or a type of relaxation technique daily for five years had lower levels of inflammatory markers, suggesting they had lower overall inflammation, when compared with active adults who did not regularly practice yoga. The study also found that these yoga devotees experienced significantly less of an increase in their inflammatory markers after a stressful event. These findings suggest that regular yoga may potentially dampen the inflammatory response or may even have a protective effect when a stressful situation arises.

Another technique to relieve stress is a form of meditation in which one pauses to focus on rhythmic breath work. Forms of meditation like this are associated with lowering cortisol levels and inflammatory markers in the blood, and breath work appears also to decrease cytokines, compounds in the body that create and promote inflammation.

For those struggling to incorporate relaxation or yoga into their day, breath work may be a good place to start. Minimal time is required, sessions ranging from two to 10 minutes can reduce stress, and it can usually be done anywhere—even an office desk!

If you're new to breath work, Jones recommends two techniques. The first is a form of focused breathing known as pranayama, in which you focus on your breath. Jones says to start by audibly inhaling through your nose and then exhaling through your nose.

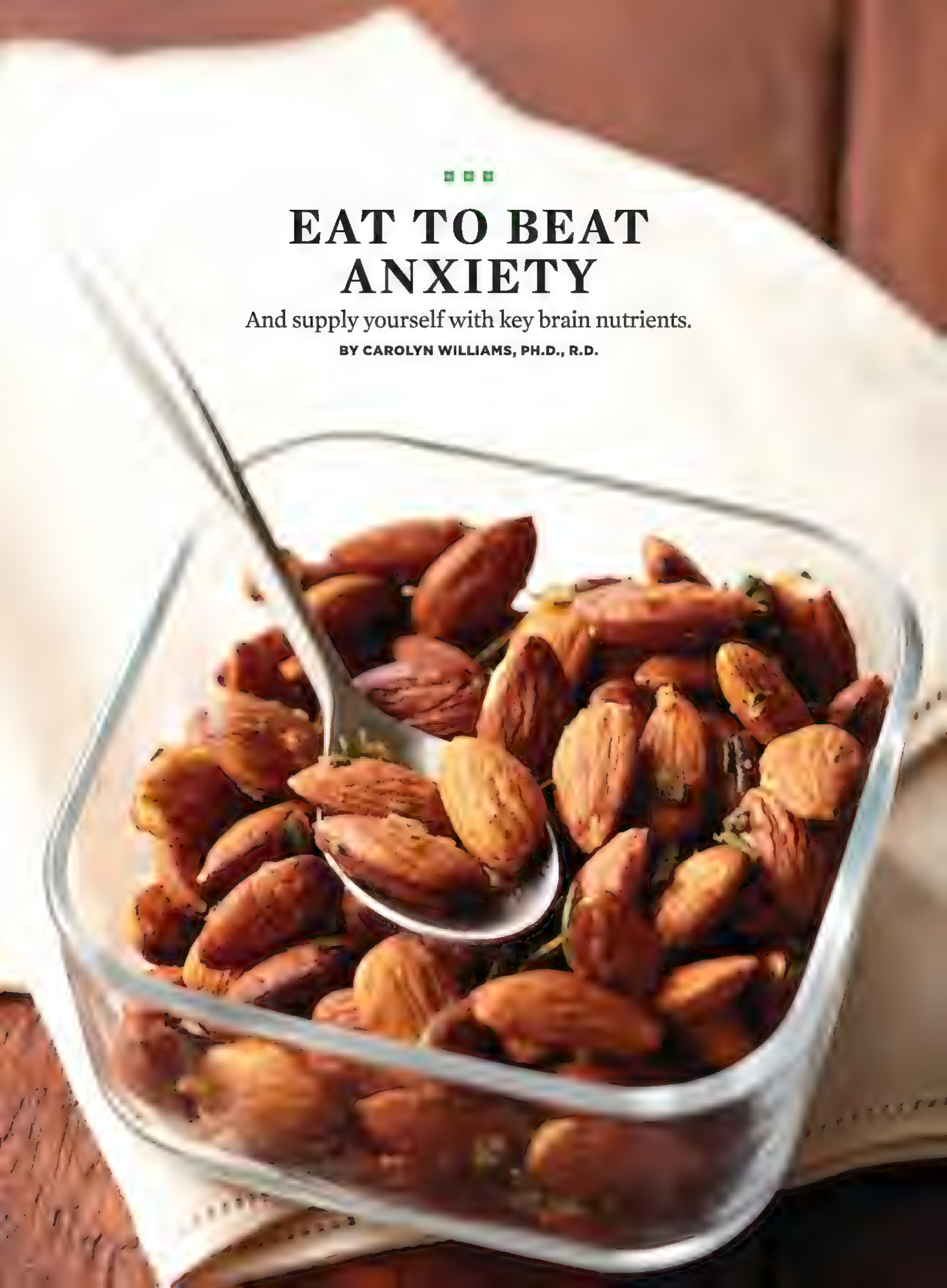
"If you were in a yoga class, you'd want the person next to you to be able to hear you breathe," Jones says. "Some call this the 'sound of the ocean' or even Darth Vader breathing. Now add a count to your breathing. Inhale for a count of four. Hold for a count of one. Exhale for a count of six. Continue for two minutes or until you feel better."

Managing stress has always been important to overall health. But when you understand the connection between stress and inflammation, it becomes a much more important health priority. Look for ways to minimize stress, as well as cope with it, and aim to regularly incorporate an activity that reduces stress and inflammation. ●

EAT TO BEAT ANXIETY

And supply yourself with key brain nutrients.

BY CAROLYN WILLIAMS, PH.D., R.D.



One-third of Americans will experience prolonged anxiety at some point in their lives, according to the National Institute of Mental Health, and symptoms like difficulty sleeping, having worries about routine things, trouble concentrating, irritability and headaches or stomach issues. While in the past treatment has largely focused on medication and therapy, research now suggests that food and nutrients should play a role too.

1. Almonds

Low magnesium levels are associated with a greater likelihood of both anxiety and depression. Research suggests that increasing magnesium intake can ease anxiety, and almonds are a top source; a 1-ounce serving provides 20% of the recommended daily value (DV). Other good sources of magnesium are cashews, peanuts and leafy greens, like spinach, and beans.

2. Eggs

Eggs are a quick, high-quality source of protein and the anti-inflammatory nutrient choline. Choline is a component of acetylcholine, a key neurotransmitter involved in memory and mood, and low choline levels are associated with higher anxiety levels. Two eggs contain 50% DV for choline, as well as other anti-inflammatory nutrients that impact brain communication, like vitamin B_{12}, selenium and zinc.

+
LOOK FOR CANNED SARDINES THAT ARE PACKED IN OLIVE OIL TO DOUBLE UP ON THE BENEFITS FROM OMEGA-3S.

3. Fatty Fish

Higher intakes of the long-chain omega-3 fatty acids DHA and EPA are associated with a lower risk of anxiety and may also lessen existing anxiety. These fatty acids ease neuroinflammation in the brain, as well as enhance neuron communication. DHA and EPA are only found in fish with a higher fat content—like salmon, sardines, mackerel and sea bass—so try to get two to three servings a week of these. Fish oil supplements are another way to get these fatty acids, but the research on whether they are as effective as eating seafood is inconclusive.

4. Probiotic-Rich Foods

Gut health influences the ability of inflammation to develop, which means it also influences the risk for mental health issues like anxiety. Strengthening the gut's microbe barrier by eating certain "good" bacterial strains helps by preventing inflammatory compounds from entering the body, which may decrease anxiety. Research is limited and not all good bacteria have an effect, but two foods that do appear to help anxiety are fermented foods—such as sauerkraut and kimchi—and dairy products that contain *Lactobacillus rhamnosus*.

FERMENTED FOODS, SUCH AS KIMCHI (EITHER DAIKON RADISH OR CABBAGE-BASED) AND SAUERKRAUT, CAN LAST 4 TO 6 MONTHS IN THE FRIDGE.

‹

5. Asparagus

Did you know that asparagus extract is an approved functional food in China because of its anti-anxiety effects? Researchers aren't clear exactly why it works, but some speculate that the vegetable's folate content plays a role, since the body uses metabolized folate to make certain neurotransmitters. High levels of antioxidants like vitamin C and beta carotene also help to reduce neuron inflammation.

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6. Blueberries

Oxidative stress creates new inflammation, and both anxiety and depression are associated with lower antioxidant levels in the body. This suggests that a lack of antioxidants from food may lead to inflammation that can potentially trigger new—or exacerbate existing—mental health issues. Eating antioxidant-rich foods is vital, and blueberries are packed with polyphenolic compounds that act as antioxidants to protect brain cells from free radicals. These compounds also promote proper brain functioning, particularly during stressful periods, and ease neuroinflammation.

7. Spinach

According to a recent study, leafy greens like spinach have high levels of nutrients specifically associated with mental health. This makes them a top choice to help prevent and ease conditions like anxiety and depression. Those nutrients include minerals like folate and magnesium, as well as vitamin C and beta carotene, which ease existing inflammation and prevent oxidative stress.

8. Lean Animal Proteins

Inadequate intake of vitamins B_6 and B_{12} can contribute to mental health issues like anxiety, since they are needed to make neurotransmitters, such as serotonin and dopamine, that control mood and cognition. Getting an adequate intake of B_6 and B_{12} can be difficult, but lean animal proteins, including beef, pork and chicken, are good sources of both, along with zinc and the antioxidant selenium, both of which also impact brain health. This doesn't negate the benefits seen from eating more plant proteins, but look for ways to incorporate lean animal proteins two to three times per week. ●

+ SKINLESS CHICKEN BREAST IS A VERSATILE STAPLE THAT CAN BE ROASTED, POACHED, BAKED OR GRILLED.

CHAPTER 3

FEED YOUR HEALTH

Much of managing inflammation stems from diet and nutrition. Keep your body healthy by loading up on these delicious staples.

HOW TO FOLLOW THE MEDITERRANEAN DIET

The widely popular and delicious diet abides by principles that help keep the body's immune response from going into hyperdrive.

BY JESSICA MIGALA

Perhaps the world's healthiest diet, the Mediterranean diet is abundant in fruits, vegetables, whole grains, legumes and olive oil. It features fish and poultry—lean sources of protein—over red meat. Red wine is consumed regularly but in moderate amounts.

Research suggests that the benefits of following a Mediterranean-style eating pattern are many: improved weight loss, better control of blood glucose (sugar) levels and reduced risk of depression, to name a few. Eating like a Mediterranean has also been associated with reduced levels of inflammation, a risk factor for heart attacks, strokes and Alzheimer's disease.

If the idea of overhauling your entire way of shopping and eating seems daunting, start small. Wiping the slate entirely clean may not be necessary, nor is it sustainable.

Here, we outline steps you can take to move toward a more Mediterranean-style diet. Choose one of these strategies below, and make it a habit. When you're ready, move on to the next strategy. No matter where you choose to start, these seven tips for starting a Mediterranean diet can help you make over your plate so you can reap the health benefits.

1. Cook with Olive Oil

If you've been cooking with vegetable or coconut oil, make the switch to extra-virgin olive oil. Olive oil is rich in monounsaturated fatty acids, which may improve HDL cholesterol, the "good" type of cholesterol. HDL cholesterol ferries "bad" LDL particles out of arteries, according to a 2017 study in *Circulation*. Use olive oil in homemade salad dressings and vinaigrettes. Drizzle it on finished dishes

like fish and chicken to boost flavor. Swap butter for olive oil in mashed potatoes, pasta and more.

2. Eat More Fish

Small amounts of fish are a welcome part of the Mediterranean diet. In particular, the diet emphasizes fatty fish like salmon, sardines and mackerel. These fish are rich in heart- and brain-healthy omega-3 fatty acids. Even fish that are leaner and have less fat (such as cod and tilapia) are still worth it, since they provide a good source of protein. If you currently don't get a lot of fish in your diet, an easy point of entry is to designate one day each week as fish night. Cooking fish in parchment paper or foil packets is one no-fuss, no-mess way to put dinner on the table. Or try incorporating it in some of your favorite foods, like tacos, stir-fries and soups.

3. Help Yourself to Whole Grains

Experiment with "real" whole grains that are still in their "whole" form and haven't been refined. Quinoa cooks up in just 20 minutes, making it a great side dish for weeknight meals. Barley is full of fiber, and it's filling: pair it with mushrooms for a steamy, satisfying soup. A hot bowl of oatmeal is perfect for breakfast on a cold winter morning. Even popcorn is a whole grain—just keep it healthy by eating air-popped corn and forgoing the butter (try a drizzle of olive oil instead). Supplement your intake with other whole-grain products, like whole-wheat bread and pasta. Look for the term "whole" or "whole grain" on food packages and in the ingredient list—it should be listed first. If you still find it too hard to make the switch from your old refined favorites, phase in a whole grain by using whole-grain blends of pastas and rice or mixing a whole grain half-and-half with a refined one (like half whole-wheat pasta and half white).

4. Eat Veggies All Day Long

If you look at your diet and worry that there's barely a green to be seen, this is the perfect opportunity to fit in more veggies. A good way to start is to eat one serving at snack time—like crunching on bell pepper strips or throwing a handful of spinach into a smoothie—and one serving at dinner, such as steamed butternut squash or honey-glazed Brussels sprouts. Aim for at least two servings per day. More is better. At least three servings can help you bust stress, Australian research notes.

5. Snack on Nuts

Nuts are another Mediterranean diet staple. Grabbing a handful, whether they're almonds, cashews or pistachios, can make for a satisfying on-the-go snack. One study in *Nutrition Journal* found that if people replaced their standard snack (cookies, chips, crackers, snack mix, cereal bars) with almonds, their diets would be lower in empty calories, added sugar and sodium. Plus, nuts contain more fiber and minerals, such as potassium, than processed snack foods.

6. Enjoy Fruit for Dessert

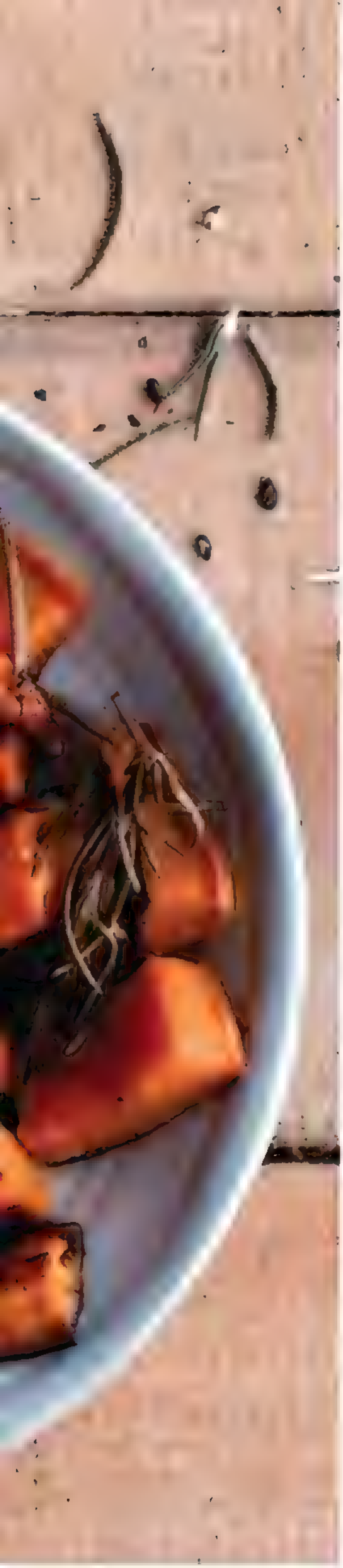
Generally a good source of fiber, vitamin C and antioxidants, fresh fruit is a healthy way to indulge your sweet tooth. If a touch of sweetness gets you to eat more fruit, try drizzling slices of pear with honey or sprinkling a little brown sugar on grapefruit. Keep fresh fruit visible at home and keep a piece or two at work so you have a healthful snack when your stomach starts growling. Lots of grocery stores stock exotic fruit—pick a new one to try each week and expand your fruit horizons.

7. Savor Every Bite

Eating like a Mediterranean is as much lifestyle as it is diet. Instead of gobbling your meal in front of the TV, slow down and sit at the table with your family and friends to savor what you're eating. Not only will you enjoy your company and your food, but eating slowly also allows you to tune into your body's hunger and fullness signals. You're more apt to eat just until you're satisfied than until you're busting-at-the-seams full. ●

TRY A TWIST ON A FRUIT SALAD BY COMBINING PEACHES WITH FRESH LIME AND MINT LEAVES.

LIKE MOST ORANGE VEGETABLES, SWEET POTATOES ARE PACKED WITH POWERFUL ANTIOXIDANTS.



THE BEST FOODS FOR FIGHTING INFLAMMATION

Plus: Packing a powerful punch of antioxidants.

BY JESSICA MIGALA & CAROLYN WILLIAMS, PH.D., R.D.

Inflammation is inevitable. It's the body's natural way of defending against foreign invaders and helping us heal from injury, which is good! But when it goes into overdrive and turns into chronic inflammation, things can get hairy. "Chronic inflammation can interrupt and damage body cells. When body cells don't function properly due to a repeated stressor, they are unable to protect against disease or can initiate changes in the body which can contribute to the development of a disease," explains Andrea Conner, M.P.H., R.D.N., of Medical Nutrition Therapy in Scottsdale, Arizona. Some diseases associated with chronic inflammation include cancer, heart disease, arthritis and diabetes.

The good news is that a healthy diet and lifestyle can help combat chronic inflammation and reduce your risk of disease. "Lowering inflammation in the body means eating a plant-forward diet and avoiding highly processed foods that contain trans fats or a lot of added sugar," says Toronto-based dietitian Pamela Fergusson, Ph.D., R.D. This way of eating means you'll be getting those good-for-you nutrients that work together to quell inflammation while you eliminate the foods that tend to trigger it. And while there isn't any one food in particular that will cure all your ills (research shows that the Mediterranean diet as a whole is the most effective one for combating inflammation), there are certain foods that pack a powerful punch of antioxidants to help you get started. Add more of these healthy foods into

your routine, aim for seven to eight hours of sleep per night, stay active and reduce stress where you can to fight inflammation.

Nuts and Seeds

From almonds to cashews, pistachios to walnuts, you can choose your favorite (or mix them up) when designing an anti-inflammatory diet. In a study of more than 5,000 adults published in the *American Journal of Clinical Nutrition*, people who said they ate nuts five or more times a week had lower levels of inflammatory biomarkers, like C-reactive protein and interleukin-6, in their blood. Eat 1 to 2 tablespoons of chia seeds, ground flaxseed or walnuts to get plant-based omega-3 fats a few times a week. Healthy omega-3 fatty acids, which have been found to turn off pro-inflammatory genes in the body and rev cells' ability to scrub themselves of harmful components, can also be found in wild-caught salmon and other fatty fish, like sardines and mackerel. Add nuts to your pesto, sprinkle them over a salad or turn them into energy bites—or just enjoy them on their own.

Beets

Just as cherries contain anthocyanins, beets contain different phytochemicals, called betalains, that act similarly in the body to fight inflammation. Whether you add beets to your juicer or roast them to use as a salad topper, you'll be getting a healthy dose of helpful nutrients.

Avocados

Packed with healthy monounsaturated fatty acids that help keep our hearts happy, avocados are also an excellent source of fiber: half an avocado offers nearly 7 grams of the recommended 25 and 38 grams of fiber per day (for women and men, respectively). "One of the simplest things you can do to eat in an anti-inflammatory way and prevent disease is eat a diet high in fiber," says Fergusson. For one, fiber makes losing weight and maintaining a healthy weight easier,

Six Spices to Count On

Flavorful ways to tamp down inflammation.

BY CAROLYN WILLIAMS, PH.D., R.D.

RED PEPPER
The compound responsible for red pepper's spicy heat, capsaicin, is the same one that gives red pepper anti-inflammatory and antioxidant properties, particularly when it comes to cancer. In fact, research suggests that capsaicin has the ability to prevent or halt cancer cell growth by inhibiting cancer-related inflammatory compounds. Capsaicin also has potential benefits for relieving pain and lowering cholesterol.

BLACK PEPPER
"Black gold" is how spice traders referred to pepper hundreds of years ago because of its monetary value, and we might want to call it that today because of its health benefits. Coming from dried unripe pepper berries, black peppercorns contain several compounds that impart anti-inflammatory effects and even enhance the absorption of curcumin.

CINNAMON
It's one we often save for baking, but cinnamon is a spice to incorporate on a regular basis. That's because research on cinnamon's anti-inflammatory effects suggests that the spice can play a therapeutic role in lowering blood sugar, reducing cholesterol, managing neurodegenerative diseases and halting the proliferation of some cancers. Try sprinkling cinnamon in oatmeal, yogurt and coffee rather than in baked goods that have added sugar. (Added sugar is a pro-inflammatory food.)

CLOVES
Antioxidants are a key part of an anti-inflammatory diet because they stop free radicals from initiating inflammation, and among spices, cloves have some of the highest antioxidant activity. Eugenol, the active compound in clove, also appears to suppress inflammatory pathways to inhibit the progression of asthma and the growth of cancer cells. Research is currently exploring eugenol's potential for treating diabetes and depression.

ROSEMARY
Imparting a woody lemon scent, rosemary's needle-like leaves can be used fresh, dried and ground in cooking. The spice has biologically active compounds that induce anti-inflammatory effects, which impact the brain and gut in particular. Because depression stems from increased inflammatory pathways in the body along with changes in the gut-brain axis, some research suggests that rosemary can play a therapeutic role in treating depression by alleviating brain inflammation and rebalancing gut bacteria.

TURMERIC
Because of its anti-inflammatory potential, turmeric has surged in popularity, even becoming a daily supplement for many. Its benefits stem from curcumin, a compound that appears to inhibit inflammatory cytokines and block free radicals from triggering new inflammation. These actions are why some suggest turmeric as a treatment for Alzheimer's because it provides neuroprotection and offers benefits for a host of other conditions. The only downside is curcumin's low bioavailability. However, combining turmeric with black pepper increases curcumin's bioavailability by 2,000%.

BLACK PEPPER HAS MORE FLAVOR WHEN IT IS FRESHLY GROUND.

SPIRALIZED CARROTS AND ZUCCHINI ARE HEALTHY ALTERNATIVES TO PASTA

which in turn helps ward off weight-related inflammation. Additionally, fiber keeps our gut microbiome happy and healthy, which we now know plays a critical role in inhibiting the development of chronic diseases.

Sweet Potatoes

Starchy vegetables like sweet potatoes can—and should—be part of an anti-inflammatory diet. They're a great way to meet daily carb needs, and they have a lower glycemic impact than even brown rice and whole-wheat bread. These spuds offer additional anti-inflammatory potential, since they're loaded with vitamin C and beta carotene, two protective antioxidants.

Dark Leafy Greens

A smart goal to up your nutrition game: a salad a day. Aim for dark leafy greens, like kale, spinach and collards, all of which pack nutrients, most notably lutein, folate and vitamin K, that slow the simmer of inflammation.

It's for that reason that a study in the journal *Neurology* in 2018 found that eating just one serving per day of greens was associated with slower cognitive decline in aging adults. Research shows that every green offers unique anti-inflammatory properties, so mix things up and get a variety in your diet for the widest range of benefits.

Veggie Noodles and "Rice"

Many people benefit not only by lowering their overall carb intake, but also by getting a higher proportion of carbs from vegetables. To do both, swap carb-rich foods, like pasta and rice, for zucchini spirals and riced cauliflower or broccoli. Cauliflower and broccoli offer extra perks, since they contain sulfur-containing compounds that have powerful anti-inflammatory effects.

Red Fruits

When it comes to vitamin C, oranges tend to get all the credit, yet the reality is that one cup of strawberries provides 100% of daily vitamin C—more than a medium orange! While the vitamin provides a host of health benefits, getting adequate vitamin C is particularly important for proper immune functioning, since inflammation occurs when the immune system becomes stressed and overworked. The antioxidant vitamin offers additional anti-inflammatory benefits by stopping the free radicals that damage cells and trigger new inflammation.

Cherries pack a wallop of antioxidants that help temper inflammation—including anthocyanins (an antioxidant found in red and purple fruits and vegetables) and vitamin C (well-known for its immune-boosting properties). In a review of 29 studies looking at both tart and sweet cherries, 80% of the trials showed that cherry consumption decreased markers of oxidative stress, and 70% showed that it lowered inflammation. In the research, people were advised to consume whole fruit, juice or powder in an amount equivalent to 45 to 270 fresh cherries per day, but you don't need to eat that much every day to reap some benefits. Incorporate more cherries into your diet with smoothies, as a yogurt or oatmeal topper, in sorbet or simply on their own for an easy, naturally sweet snack.

Research suggests that both sweet and tart cherry varieties lower inflammatory blood proteins to offer pain relief effects comparable to ibuprofen. In fact, the Arthritis Foundation suggests eating cherries as a way to ease joint issues related to arthritis and gout.

Anthocyanins and other polyphenolic compounds in cherries appear to reduce inflammation by stopping potential free radicals from damaging cells, but they may also help people get more restful sleep—a lifestyle factor that's key in preventing and easing inflammation. Cherries appear to do this by increasing melatonin levels and stopping inflammatory cytokines that disrupt sleep.

Pineapples

Pineapples contain bromelain, a unique enzyme that has anti-inflammatory, anti-clotting and anti-cancer effects. Bromelain shows the greatest potential in preventing cancer growth by suppressing inflammatory factors that promote cell mutation and metastasis, and therapeutic supplements of bromelain may even provide some pain relief for certain forms of arthritis. Research also suggests that the enzyme may speed up muscle recovery after strenuous workouts by decreasing inflammation.

Yogurt

Strengthening gut health by eating foods with probiotics is essential

in fighting inflammation, and one of the best ways to do this is to incorporate yogurt with live bacteria cultures into your diet. Choose regular or Greek yogurt with a label that specifies "active, live cultures" and opt for "plain" to avoid added sugars; then add fresh fruit and a drizzle of honey for sweetness.

Watermelon

A refreshing treat in hot summer months, watermelon is known for being sweet and juicy, but the melon's nutritional perks are rarely mentioned. However, watermelon is one of the few food sources of lycopene, a powerful compound that's responsible for the melon's pink-red hue and protects the body from free radicals. Research suggests that lycopene offers an antioxidant-like protection that may prevent cell mutations, halt cancer growth and reduce the risk of Alzheimer's disease, heart disease and diabetes.

Blueberries

Polyphenolic compounds give blueberries their vibrant purple-blue color, and these compounds act as antioxidants to ease existing inflammation and prevent free radicals from triggering new inflammation.

In fact, studies suggest that regularly eating blueberries appears to have anti-inflammatory effects that have the potential to decrease blood pressure, improve blood flow and protect brain cells from neuroinflammation. And because most are flash-frozen right after being picked, frozen blueberries are ideal to keep on hand to toss in a smoothie for a daily dose of antioxidants and anthocyanins.

Edamame

All beans and legumes are great carb options, since they're packed with fiber, protein and potassium and have a lower impact on glucose than many grains and other carbs. But edamame offers a little

extra, because it also contains isoflavones, which are bioactive compounds that appear to specifically target inflammatory molecules in the body.

Quinoa

Whole grains boast extra fiber, protein and nutrients, but they vary greatly in how they impact blood sugar. Quinoa is a good option because it has a lower glycemic index compared with brown rice and whole-grain breads and pastas. Other goods ones are barley, farro and whole oats.

Apples

Apples don't have nearly as many antioxidant-like compounds as berries do, but they can reduce inflammation in another way: by strengthening your gut microbiome. Apples contain around 3 grams of fiber, a large portion of which is a soluble, fermentable type called pectin, which good bacteria strains in the gut need to thrive and grow.

Often referred to as prebiotics, these fibers can improve the composition of microbes in the gut. That, in turn, creates a stronger intestinal lining, so fewer inflammatory compounds can cross it to get into the body.

Legume-Based Pastas

Craving pasta? Try one of the newer pastas that are made with flour from chickpeas, fava beans or lentils. Compared with refined and whole-grain options, legume-based pastas have more protein, fiber and other nutrients, helping to increase satiety and minimize glycemic impact.

Dark Chocolate

Some days just call for a bite of something sweet, and it's OK to incorporate some treats with added sugars periodically and in moderation. One of the best ways to do so is to opt for a 1-ounce serving of dark chocolate. Look for a chocolate made with 70% or more cacao, which has more anti-inflammatory polyphenols and usually only a few grams of added sugar. Top a chocolate square with a little nut butter for a more-filling sweet treat! ●

Worst Carbs for Inflammation

Not all carbs are created equal. Some bring added risks.

BY CAROLYN WILLIAMS, PH.D., R.D.

Your blood sugar can spike from eating too many refined, low-fiber carbs. Additionally, carbohydrates with added sugar (think: cupcakes or processed bread) can increase inflammation in the body. In fact, the effect that carbs have on blood sugar—whether that's slow and steady or a sudden spike—is considered a primary driver of inflammation. Not to mention, eating too many refined carbs or items with lots of added sugar can lead to weight gain, which further drives inflammation.

1. DOUGHNUTS AND BREAKFAST PASTRIES

The dough may be fried or baked with butter and lard. Either way, flaky breakfast pastries are a source of saturated fats, which are top inflammatory components. Adding super-sweet glazes, icings and fillings just spurs inflammation further.

2. CANDY

Concentrated sources of sugar have an immediate impact on blood sugar, and you can feel the sugar rush. But not long after that, you'll feel blood sugar drop. The roller-coaster effect taxes the body and leads to inflammation, and bright artificial colorings can act as irritants that lead to additional inflammation.

3. MUFFINS AND BAGELS

Though muffins and bagels look a lot healthier than a doughnut or cinnamon roll and they often do have less added sugar, these breakfast treats are usually oversized and most (but not all) are made with refined flours. The result is way more carbs than most people need at a meal and a glycemic impact that's similar to a doughnut's.

4. SUGAR-SWEETENED DRINKS

Sugary sodas are obvious inflammation triggers, so drinks like lemonade and sweet tea may seem like a much better choice. However, they really aren't much better because they contain comparable amounts of sugar, and excess sugar has the same effect on the body no matter where it comes from.

5. PACKAGED SNACK FOODS WITH MORE THAN FIVE INGREDIENTS

Not all packaged snack foods are bad. However, if that packaged snack food has five or more ingredients—especially a few you've never heard of—then it's a safe bet that it's not a healthy one. It probably also has an assortment of inflammatory triggers, such as refined flours, added sugars, artificial colors and chemical additives and compounds.

6. SPECIALTY COFFEE DRINKS

They're easy to forget about, but coffee drinks can be a major source of calories and carbs due to added syrups and sugars. And while a cup or two of coffee is fine, consuming anything in excess can lead to inflammation. Keep tabs not only on what's going in your coffee, but also on how much you're getting in a day.

7. SUGARY COCKTAILS

Alcohol can be part of an anti-inflammatory diet if it's in moderation and with minimal extra calories and carbs, but frozen adult beverages like margaritas are loaded with calories and carbs from sugar. A glass of wine, beer or liquor with a low-sugar mixer is a much better bet.

FOODS THAT FIGHT PAIN

These anti-inflammatory remedies can help naturally relieve pain from sore muscles, headaches, upset stomachs and more.

BY KERRI-ANN JENNINGS

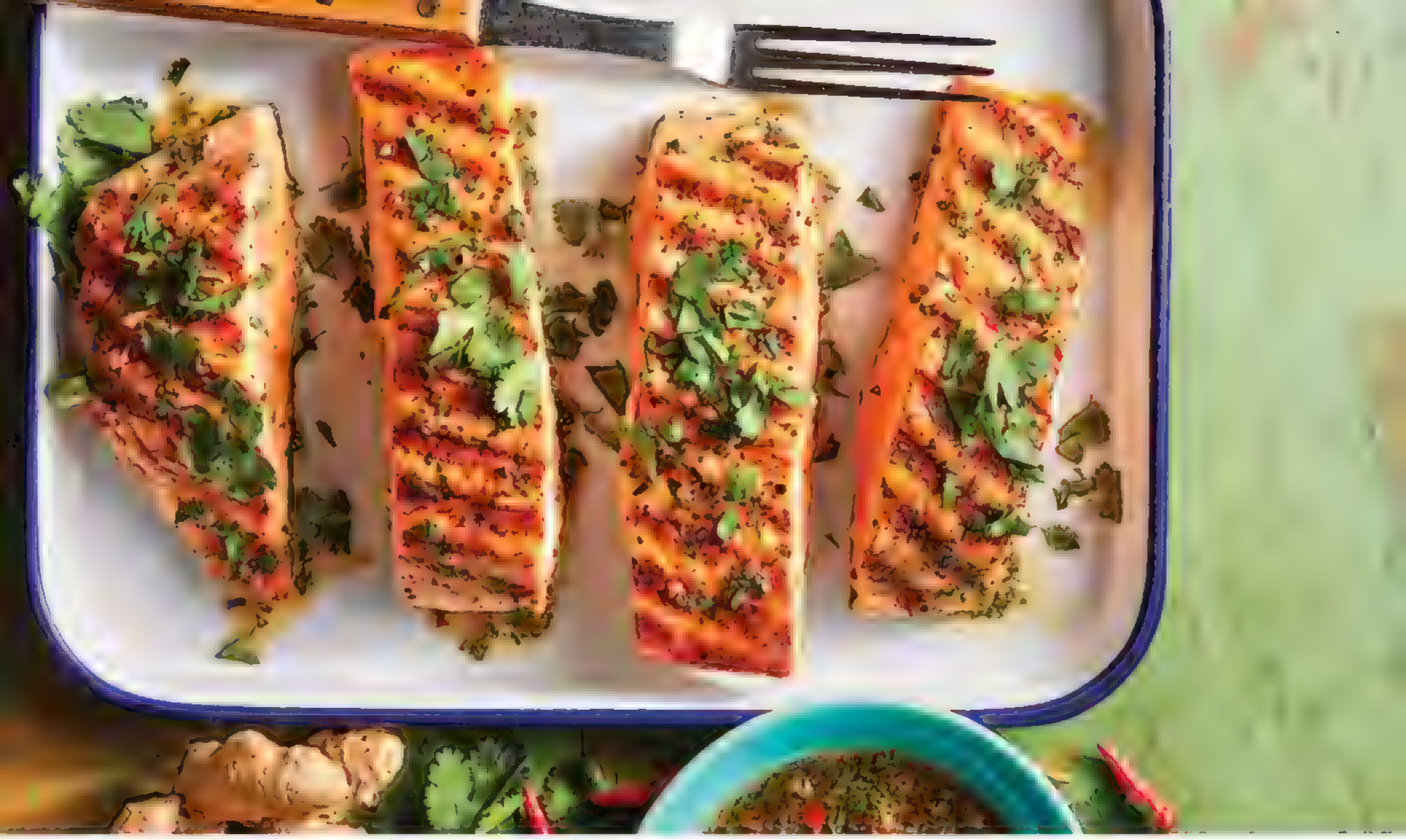
When you have a lot of ailments, popping pills for every ache and pain can leave you feeling like a walking drugstore, so it's no wonder that some of us would rather brave through a headache than take a pill. But can you fight aches and pains naturally with foods—without medication?

While over-the-counter and prescription medications definitely serve a purpose, we've found science that shows you can get some pain-fighting effects from food. One of the hallmarks of inflammatory conditions is that the stimuli produce pain. That can be acute pain, as from an immediate injury, but inflammation can also trigger chronic pain. Because of this, there is a link between the types of food that can help tame inflammation and the ingredients that can help you feel better naturally.

Ginger

Good for: Sore muscles and aching joints

Ginger isn't just for relieving unsettled stomachs and the common cold. In fact, ginger is rich in inflammation-fighting compounds, such as gingerols, which may reduce the aches of osteoarthritis and soothe sore muscles. In a study, people who took ginger capsules daily for 11 days reported 25% less muscle pain when they performed exercises designed to strain their muscles. Another study found that ginger-extract injections helped relieve osteoarthritis pain in the knee. Ginger may also help lessen pain and symptoms in other types of arthritis, including psoriatic arthritis. The Arthritis Foundation recommends ginger as a safe and alternative therapy to try.



Salmon

Good for: inflamed joints and troubled tummies

Preliminary studies suggest that omega-3s may help quell the aches and pains of rheumatoid arthritis. And that's no surprise, since omega-3s are touted for their ability to reduce inflammation. In addition to soothing aching joints, omega-3s can also tame your troubled tummy (especially when caused by stress), according to a study in the *Scandinavian Journal of Nutrition*.

Coffee

Good for: headaches and migraines

Studies show that 200 milligrams of caffeine—about the amount in 16 ounces of brewed coffee—provides relief from headaches, including migraines. If you don't want to be a daily coffee drinker, that strategy may backfire. Regular coffee drinkers might suffer headaches when they cut back, but there's nothing unhealthy about having a daily cup or two.

Sage

Good for: sore throat

When your throat is scratchy and irritated, try sipping on a tea made from brewed sage leaves. It's a remedy recommended by herbalists that has some support from clinical trials. A study found that spraying sore throats with a sage solution was more effective for pain relief than a placebo.

Cherry Juice

Good for: tired muscles

Sore muscles after a workout don't have to be a given. British researchers recently found that people who drank 1 ounce of concentrated cherry juice twice daily for 10 days bounced back faster from their workout (an intensive leg-resistance training session on day 8) than those who skipped the juice. The researchers think that the anti-inflammatory and antioxidant properties in tart cherries—and other dark red and purple fruit juices, like grape, pomegranate, acai, blueberry and cranberry—act as natural NSAIDs (nonsteroidal anti-inflammatory drugs, such as ibuprofen and aspirin), reducing exercise-induced muscle damage. ●

RECIPES TO BOLSTER HEALTH

HIT THE KITCHEN

These anti-inflammatory dinner recipes highlight the foods mentioned throughout these pages. Plus, these delicious dishes are weeknight-friendly.

Sumac Chicken Thighs with Purple Cauliflower

ACTIVE: 25 min **TOTAL:** 3 hours (including 2 hours marinating time)
TO MAKE AHEAD: Marinate chicken (Step 1) overnight.

Cauliflower has gone full technicolor, leaping from white to bright orange, neon green and—you guessed it—purple. The chicken in this recipe gets its hue from a marinade that's seasoned with tangy sumac.

4 tablespoons extra-virgin olive oil, divided
Juice of ½ lemon
3 cloves garlic, minced
2 tablespoons ground sumac
1 teaspoon ground cumin
¾ teaspoon salt, divided
2 pounds bone-in chicken thighs, trimmed
1 2-pound head purple cauliflower, cut into florets (8 cups)
1 medium red onion, cut into ½-inch wedges
½ cup labneh or whole-milk plain Greek yogurt
2 tablespoons pine nuts, toasted
1 tablespoon chopped fresh parsley

1. Whisk 2 tablespoons oil, lemon juice, garlic, sumac, cumin and ¼ teaspoon salt in a medium bowl. Add chicken and turn to coat. Cover and marinate in the refrigerator for at least 2 hours or overnight.
2. Position racks in center and lower third of oven. Place a rimmed baking sheet on the lower rack and preheat to 400°F.
3. Place cauliflower and onion on another rimmed baking sheet. Drizzle with the remaining 2 tablespoons oil and season with the remaining ½ teaspoon salt; toss to coat. Remove the chicken from the marinade (discard the remaining marinade) and place, skin-side down, on the preheated pan; return to the lower rack. Place the vegetables on the center rack. Roast, turning the chicken and stirring the vegetables halfway through, until an instant-read thermometer inserted in the thickest part without touching bone registers 165°F and the vegetables are tender, 25 to 35 minutes.
4. Smear labneh (or yogurt) on a serving platter and top with the chicken and vegetables. Drizzle with any juices from the chicken and sprinkle with pine nuts and parsley.

SERVES 4: 3 OZ. CHICKEN & 1½ CUPS VEGETABLES EACH
CAL 567 **FAT** 39G (SAT 9G) **CHOL** 177MG
CARBS 18G **TOTAL SUGARS** 7G (ADDED 0G)
PROTEIN 39G **FIBER** 6G **SODIUM** 653MG
POTASSIUM 1,203MG

Old Thymy Salmon with Lemony Mashed Peas

ACTIVE: 20 min **TOTAL:** 20 min

Cooking butter until it browns adds a toasty, nutty flavor. Here it gives Old Bay-rubbed salmon a chef-worthy finish—not bad for 20 minutes!

- **1 pound peas, fresh or frozen**
- **¼ cup crème fraîche or sour cream**
- **½ teaspoon lemon zest**
- **3 tablespoons lemon juice**
- **¼ teaspoon salt**
- **¼ teaspoon ground pepper**
- **1 tablespoon extra-virgin olive oil**
- **1¼ pounds skin-on salmon, cut into 4 pieces**
- **2 teaspoons Old Bay seasoning**
- **1 tablespoon butter**
- **2 teaspoons fresh thyme leaves**
- **Lemon wedges for serving**

1. Bring a medium saucepan of water to a boil over high heat. Add peas and cook until tender, about 5 minutes. Reserve ¼ cup of the water, then drain. Combine the peas, the reserved water, crème fraîche (or sour cream), lemon zest, lemon juice, salt and pepper in a food processor. Pulse until roughly chopped. Spread onto a serving platter.

2. Heat oil in a large cast-iron or nonstick skillet over medium-high heat. Sprinkle salmon with Old Bay and add to the pan, skin-side up. Cook, flipping once, until it is browned and flakes with a fork, 6 to 7 minutes total.

3. Arrange the salmon on top of the peas. Add butter and thyme to the pan. Cook, stirring, until the butter is brown and fragrant, about 30 seconds. Drizzle over the salmon. Serve with lemon wedges, if desired.

SERVES 4: 4 OZ. SALMON & ½ CUP PEAS EACH
CAL 370 **FAT** 18G (SAT 7G) **CHOL** 86MG **CARBS** 17G **TOTAL SUGARS** 6G (ADDED 0G) **PROTEIN** 35G **FIBER** 5G **SODIUM** 669MG **POTASSIUM** 714MG

Poached Chicken & Arugula Salad with Tomatoes & Chili Crisp

ACTIVE: 25 min **TOTAL:** 45 min

TO MAKE AHEAD: Refrigerate dressing (Step 3) for up to 3 days.

Chili crisp is a savory condiment with bite that's made of a mix of chile oil and crispy seasonings, including dried chile, Sichuan peppercorn and onion. Find it in Asian markets or simply substitute chile oil.

SALAD

- **2 pounds bone-in chicken breasts**
- **3 bay leaves, preferably fresh**
- **1 small white onion, halved and thinly sliced**
- **2 large ripe tomatoes, cut into 1-inch pieces**
- **1 cup arugula or other flavorful leafy greens, woody stems trimmed**
- **1 cup fresh basil leaves**
- **1 cup fresh cilantro leaves**
- **½ cup fresh mint leaves**

DRESSING

- **¼ cup extra-virgin olive oil**
- **¼ cup lemon juice**
- **1 tablespoon spicy chili crisp or chile oil**
- **1 tablespoon ground sumac**
- **¾ teaspoon coriander seeds, toasted and crushed**
- **¾ teaspoon fennel seeds, toasted and crushed**
- **½ teaspoon ground cardamom**
- **½ teaspoon onion or garlic powder**
- **½ teaspoon salt**
- **½ teaspoon ground pepper**

1. To prepare chicken & onion: Place chicken and bay leaves in a large saucepan and add water to cover by 1 inch. Bring to a simmer over high heat. Adjust heat to maintain a simmer, cover and simmer until an instant-read thermometer inserted in the thickest part without touching bone reaches 165°F, 25 to 30 minutes. Transfer the chicken to a clean cutting board.

2. Meanwhile, soak onion in ice water for 1 minute; drain and pat dry.

3. To prepare dressing: Whisk oil, lemon juice, chili crisp (or chile oil), sumac, coriander and fennel seeds, cardamom, onion (or garlic) powder, salt and pepper in a large bowl.

4. To assemble salad: When the chicken is cool enough to handle, discard the skin and bones and shred the meat. Add the shredded chicken and any accumulated juices to the dressing, along with tomatoes and the onion; toss to coat. Add arugula (or greens), basil, cilantro and mint; toss again. Arrange on a large platter so the chicken, tomatoes and onions are distributed throughout the greens (and not sitting at the bottom).

SERVES 6: 1½ CUPS EACH
CAL 261 **FAT** 15G (SAT 2G) **CHOL** 68MG
CARBS 5G **TOTAL SUGARS** 2G (ADDED 0G)
PROTEIN 26G **FIBER** 2G **SODIUM** 421MG
POTASSIUM 423MG

Scallops with White Bean Ragu & Charred Lemon

ACTIVE: 25 min **TOTAL:** 25 min

Giving lemons a quick sizzle in the skillet amps up the flavor of this piccata-inspired dish. The heat helps release even more citrus juice and sweetens it.

- **3 teaspoons extra-virgin olive oil, divided**
- **1 pound mature spinach or white chard, trimmed and thinly sliced**
- **2 cloves garlic, minced**
- **1 tablespoon capers, rinsed and chopped**
- **½ teaspoon ground pepper, divided**
- **1 15-ounce can no-salt-added cannellini beans, drained**
- **1 cup low-sodium chicken broth**
- **⅓ cup dry white wine**
- **1 tablespoon butter**
- **1 pound dry sea scallops, tough side muscle removed**
- **1 lemon, halved**
- **2 tablespoons chopped fresh parsley**

1. Heat 2 teaspoons oil in a large skillet over medium-high heat. Add greens and cook, stirring often, until wilted, about 4 minutes. Stir in garlic, capers and ¼ teaspoon pepper; cook, stirring occasionally, until fragrant, about 30 seconds. Add beans, broth and wine and bring to a simmer. Reduce heat to maintain a low simmer, cover and cook for 5 minutes. Remove from heat and stir in butter. Cover to keep warm.

2. Meanwhile, sprinkle scallops with the remaining ¼ teaspoon pepper. Heat the remaining 1 teaspoon oil in a large nonstick skillet over medium-high heat. Add the scallops and cook until browned on both sides, about 4 minutes total. Transfer to a clean plate. Add lemon halves to the pan, cut-side down, and cook until charred, about 2 minutes. Cut into wedges. Sprinkle the scallops and the bean ragu with parsley and serve with the lemon wedges.

SERVES 4: 3 OZ. SCALLOPS & 1 CUP RAGU EACH
CAL 255 **FAT** 8G (SAT 3G) **CHOL** 35MG **CARBS** 21G **TOTAL SUGARS** 1G (ADDED 0G) **PROTEIN** 21G **FIBER** 5G **SODIUM** 590MG **POTASSIUM** 853MG

Korean BBQ Tempeh Grain Bowl

ACTIVE: 20 min **TOTAL:** 35 min

If you're a tempeh skeptic, you've probably never had the firm soy-based slabs slathered with a sweet-and-spicy barbecue sauce. We give the combo a punch of umami with tamari and add a little heat courtesy of gochujang.

½ cup water, divided
5 tablespoons rice vinegar, divided
4 tablespoons reduced-sodium tamari, divided
4 tablespoons light brown sugar, divided
2 cups thinly sliced napa cabbage
1 cup thinly sliced radishes
1 tablespoon gochujang
3 cloves garlic, minced
1 teaspoon grated peeled fresh ginger
1 tablespoon cornstarch
8 ounces tempeh, cut crosswise into 16 pieces
2 cups cooked brown rice
¼ cup fresh cilantro

1. Preheat oven to 425°F. Set a wire rack on a rimmed baking sheet and coat with cooking spray.
2. Whisk ¼ cup water, 4 tablespoons vinegar and 1 tablespoon each tamari and brown sugar in a medium bowl. Add cabbage and radishes and toss to combine. Set aside, tossing occasionally.
3. Meanwhile, combine the remaining 1 tablespoon vinegar, 3 tablespoons each tamari and brown sugar, gochujang, garlic and ginger in a small saucepan. Bring to a simmer over medium-high heat. Cook, stirring occasionally, for 2 minutes. Whisk the remaining ¼ cup water and cornstarch in a small bowl. Slowly add the cornstarch mixture to the sauce, whisking constantly. Cook until thickened, about 1 minute.
4. Pour half the sauce into a medium bowl and add tempeh; gently toss to coat. Transfer the tempeh to the prepared rack. Bake until the sauce is tacky, about 15 minutes. Return the tempeh to the bowl and add the remaining sauce. Gently toss to coat.
5. Divide rice among 4 bowls. Transfer the pickled vegetables to the bowls using a slotted spoon; drizzle with the liquid, if desired. Top with the tempeh and sprinkle with cilantro.

SERVES 4: 1¾ CUPS EACH
CAL 333 **FAT** 7G (SAT 2G) **CHOL** 0MG
CARBS 52G **TOTAL SUGARS** 15G (ADDED 14G) **PROTEIN** 17G **FIBER** 3G
SODIUM 817MG **POTASSIUM** 507MG

Golden Milk-Poached Chicken & Chickpea Salad with Broccoli

ACTIVE: 25 min **TOTAL:** 40 min

TO MAKE AHEAD: Refrigerate chicken and dressing (Steps 1 & 2) separately for up to 2 days.

Poaching chicken in turmeric-infused milk yields tender results with a golden hue. Don't toss the cooking liquid: some of it goes into the salad dressing, and you can use what remains to cook grains or as a soup base. Make sure to use whole milk and don't go beyond a bare simmer—otherwise, it may curdle.

- **2 cups whole milk**
- **1 tablespoon ground coriander**
- **1 tablespoon ground cumin**
- **1 tablespoon ground turmeric**
- **2 large cloves garlic, crushed**
- **1½ teaspoons salt, divided**
- **1 pound boneless, skinless chicken breasts, trimmed**
- **1 15-ounce can chickpeas, rinsed**
- **¼ cup extra-virgin olive oil**
- **3 tablespoons red-wine vinegar**
- **1 5-ounce package baby arugula**
- **4 cups bite-size broccoli florets**
- **¼ cup fresh cilantro**

1. Whisk milk, coriander, cumin, turmeric, garlic and 1 teaspoon salt in a large saucepan. Bring to a simmer over medium heat. Add chicken and chickpeas. Adjust heat to maintain a bare simmer and cook, partially covered and turning the chicken occasionally, until an instant-read thermometer inserted in the thickest part registers 165°F, about 20 minutes.

2. Transfer the chicken to a clean plate and cover to keep warm. Pour the poaching liquid through a fine-mesh strainer set over a medium heatproof bowl. Transfer ¼ cup of the liquid and the garlic to a mini food processor. Add oil, vinegar and the remaining ½ teaspoon salt. Process the dressing until smooth.

3. Slice or shred the chicken and combine in a large bowl with the chickpeas, arugula, broccoli and cilantro. Toss with the dressing.

SERVES 4: 3 CUPS EACH
CAL 371 **FAT** 19G (SAT 3G) **CHOL** 66MG **CARBS** 19G **TOTAL SUGARS** 5G (ADDED 0G) **PROTEIN** 31G **FIBER** 6G **SODIUM** 642MG **POTASSIUM** 665MG

Greek Salad with Edamame

ACTIVE: 30 min **TOTAL:** 30 min

Edamame adds vegetarian protein and vibrant color to the classic Greek salad. Serve with toasted pita brushed with olive oil and sprinkled with dried oregano or za'atar.

¼ cup red-wine vinegar
3 tablespoons extra-virgin olive oil
¼ teaspoon salt
¼ teaspoon ground pepper
8 cups chopped romaine (about 2 romaine hearts)
16 ounces frozen shelled edamame (about 3 cups), thawed
1 cup halved cherry or grape tomatoes
½ European cucumber, sliced
½ cup crumbled feta cheese
¼ cup slivered fresh basil
¼ cup sliced Kalamata olives
¼ cup slivered red onion

Whisk vinegar, oil, salt and pepper in a large bowl. Add romaine, edamame, tomatoes, cucumber, feta, basil, olives and onion; toss to coat.

SERVES 4: 2¾ CUPS EACH
CAL 344 **FAT** 23G (SAT 5G
CHOL 17MG **CARBS** 20G
TOTAL SUGARS 6G (ADDED 0G)
PROTEIN 17G **FIBER** 9G **SODIUM** 489MG
POTASSIUM 908MG

Butternut Squash & Piquillo Pepper Salad

ACTIVE: 50 min
TOTAL: 1 hour 10 min
TO MAKE AHEAD: Refrigerate pickled celery, roasted squash and the goat cheese mixture separately for up to 1 day.

Sour celery pickles, tangy goat cheese, spicy peppers and sweet squash seasoned with fragrant coriander and cumin create a flavor explosion for a tasty alternative to leafy green salads.

1½ cups water, divided
½ cup rice vinegar
2 tablespoons chopped jalapeño pepper
2 tablespoons sugar
1 tablespoon kosher salt plus ¾ teaspoon, divided
1 teaspoon grated fresh ginger
1 teaspoon yellow mustard seeds
2 stalks celery, cut into ½-inch pieces
8 cups cubed (1-inch) peeled butternut squash
6 tablespoons extra-virgin olive oil, divided
1 tablespoon ground coriander
1 tablespoon ground cumin
2 tablespoons red-wine vinegar
1½ teaspoons whole-grain mustard
1 teaspoon honey
1 clove garlic, grated
½ teaspoon ground pepper, divided
1 10-ounce jar piquillo peppers, rinsed and sliced
4 ounces goat cheese
1 cup toasted pecans, chopped
1 cup fresh cilantro

1. Combine 1 cup water, rice vinegar, jalapeño, sugar, 1 tablespoon salt, ginger and mustard seeds in a small saucepan. Bring to a simmer over medium-high heat. Place celery in a heatproof bowl and pour the vinegar mixture over it. Let stand at room temperature for 1 hour. Drain, reserving the celery, jalapeño and mustard seeds.

2. Meanwhile, preheat oven to 350°F and line a rimmed baking sheet with parchment paper.

3. Toss squash, 2 tablespoons oil, coriander, cumin and ¼ teaspoon salt in a large bowl. Transfer to the prepared pan and roast, stirring once, until tender, about 30 minutes.

4. Whisk red-wine vinegar, mustard, honey, garlic, the remaining 4 tablespoons oil and ¼ teaspoon each salt and pepper in the large bowl. Add the squash and peppers; stir to coat.

5. Whisk goat cheese, the remaining ⅓ cup water and ¼ teaspoon each salt and pepper in a small bowl until smooth. Spread the mixture on a serving platter and top with the squash, celery, jalapeño, mustard seeds, pecans and cilantro.

SERVES 8: ABOUT 1 CUP EACH
CAL 289 **FAT** 23G (SAT 4G) **CHOL** 7MG
CARBS 18G **TOTAL SUGARS** 4G (ADDED 1G)
PROTEIN 6G **FIBER** 6G **SODIUM** 421MG
POTASSIUM 437MG

Miso-Maple Salmon

ACTIVE: 15 min **TOTAL:** 15 min
TO MAKE AHEAD: Refrigerate leftovers for up to 2 days.

White miso packs an umami punch. But being the mildest and sweetest variety of the fermented paste, it won't overpower this dish. Pair the salmon with a healthy side salad for a complete dinner.

2 lemons
2 limes
¼ cup white miso
2 tablespoons extra-virgin olive oil
2 tablespoons maple syrup
¼ teaspoon ground pepper
Pinch of cayenne pepper
2½ pounds skin-on salmon fillet
Sliced scallions for garnish

1. Position rack in upper third of oven; preheat broiler to high. Line a large rimmed baking sheet with foil.
2. Juice 1 lemon and 1 lime into a small bowl. Whisk in miso, oil, maple syrup, pepper and cayenne. Place salmon, skin-side down, on the prepared pan and spread the miso mixture on top. Halve the remaining lemon and lime and arrange around the salmon, cut-sides up.
3. Broil the salmon just until it flakes with a fork, 7 to 12 minutes. Serve with the lemon and lime halves and sprinkle with scallions, if desired.

SERVES 8: 4 OZ. SALMON EACH
CAL 230 **FAT** 9G (SAT 2G)
CHOL 66MG **CARBS** 7G
TOTAL SUGARS 3G (ADDED 3G)
PROTEIN 28G **FIBER** 0G
SODIUM 341MG **POTASSIUM** 549MG

Summer Vegetable Sesame Noodles

ACTIVE: 20 min **TOTAL:** 20 min

Squash noodles elbow out some of the starchy ones to give this cool salad a veggie boost.

1 medium yellow squash
1 medium zucchini
1 cup corn kernels, fresh or frozen
8 ounces soba noodles
¼ cup ponzu sauce
2 tablespoons tahini
2 tablespoons toasted sesame oil
1 tablespoon rice vinegar
¼ teaspoon salt
1 pint cherry tomatoes, halved
3 scallions, sliced
2 teaspoons sesame seeds

1. Put a large saucepan of water on to boil.

2. Spiralize squash and zucchini into medium-thick "noodles." *(Alternatively, cut them lengthwise into long, thin strips with a vegetable peeler. Stop when you reach the seeds in the middle—seeds make the strips fall apart.)* Place the vegetable noodles and corn in a large colander.

3. Cook soba noodles in the boiling water according to package directions. Pour over the vegetables in the colander to drain.

4. Meanwhile, combine ponzu, tahini, oil, vinegar and salt in a large bowl.

5. Add the soba and vegetable noodles to the bowl along with tomatoes and scallions. Toss to combine. Serve topped with sesame seeds.

SERVES 4: 2 CUPS EACH
CAL 387 **FAT** 13G (SAT 2G) **CHOL** 0MG
CARBS 61G **TOTAL SUGARS** 6G
(ADDED 0G) **PROTEIN** 15G **FIBER** 6G
SODIUM 629MG **POTASSIUM** 621MG

Lemon-Garlic Chicken with Green Beans

ACTIVE: 20 min **TOTAL:** 20 min

Chicken cutlets cook in less than 10 minutes! Can't find them? Make your own from chicken breasts. Place each breast on a cutting board and, with your knife parallel to the board, slice into the skinny side of the chicken breast in a single smooth motion.

1 pound chicken breast cutlets
1 teaspoon salt, divided
½ teaspoon ground pepper, divided
2 tablespoons extra-virgin olive oil, divided
6 cups green beans (about 1 pound), trimmed
4 cloves garlic, thinly sliced
1 teaspoon grated lemon zest
1 teaspoon chopped fresh thyme, plus leaves for garnish
¼ cup unsalted chicken broth
¼ cup dry white wine
1 tablespoon lemon juice
¼ cup toasted pine nuts
Lemon wedges for garnish

1. Sprinkle chicken with ½ teaspoon salt and ¼ teaspoon pepper. Heat 1 tablespoon oil in a large skillet over medium-high heat. Cook the chicken, turning once, until an instant-read thermometer inserted in the thickest part registers 165°F, 3 to 4 minutes per side. Transfer to a plate.

2. Add the remaining 1 tablespoon oil and green beans to the pan. Sprinkle with the remaining ½ teaspoon salt and ¼ teaspoon pepper and cook, stirring occasionally, until tender-crisp, about 2 minutes. Stir in garlic, lemon zest and thyme; cook, stirring, until fragrant, about 1 minute. Add broth, wine and lemon juice and return the chicken and any accumulated juices to the pan. Cook, stirring occasionally, until the liquid is reduced by half, about 1 minute more.

3. Serve topped with pine nuts, more thyme and lemon wedges, if desired.

SERVES 4: 3 OZ CHICKEN & 1 CUP BEANS EACH
CAL 296 **FAT** 16G (SAT 2G) **CHOL** 63MG
CARBS 11G **TOTAL SUGARS** 4G (ADDED 0G)
PROTEIN 27G **FIBER** 4G **SODIUM** 652MG
POTASSIUM 519MG

Chicken with Basil-Anchovy Butter & Shishito Peppers

ACTIVE: 20 min **TOTAL:** 20 min

Don't skip the anchovies. Their fishiness blends in, adding salty, umami flavor, so even skeptics of the salty little fish won't protest.

- **1 pound boneless, skinless chicken thighs, trimmed**
- **½ teaspoon kosher salt, divided**
- **½ teaspoon ground pepper**
- **¼ teaspoon garlic powder**
- **3 teaspoons extra-virgin olive oil, divided**
- **1½ tablespoons butter, softened**
- **1½ tablespoons chopped fresh basil**
- **2 anchovies, minced**
- **6 cups shishito or Padrón peppers**
- **Lemon wedges for serving, charred if desired**

1. Make three slits on one side of each chicken thigh; sprinkle with ¼ teaspoon salt, ground pepper and garlic powder.

2. Heat 1 teaspoon oil in a large cast-iron pan over medium-high heat. Add the chicken and cook, turning once, until golden brown and an instant-read thermometer inserted in the thickest part registers 165°F, 3 to 4 minutes per side. Transfer to a serving platter.

3. Meanwhile, combine butter, basil and anchovies in a small bowl.

4. Add the remaining 2 teaspoons oil and peppers to the pan. Cook, stirring and scraping up any browned bits, until starting to blacken in spots, 2 to 3 minutes. Transfer to a bowl and sprinkle with the remaining ¼ teaspoon salt.

5. Top the chicken with the butter mixture and serve with the peppers and lemon wedges, if desired.

SERVES 4: 3 OZ. CHICKEN, 1 CUP PEPPERS & 1 TBSP BASIL-ANCHOVY BUTTER EACH
CAL 265 **FAT** 17G (SAT 6G) **CHOL** 89MG
CARBS 5G **TOTAL SUGARS** 3G (ADDED 0G)
PROTEIN 23G **FIBER** 2G **SODIUM** 381MG
POTASSIUM 354MG

Avocado & White Bean Sandwich

ACTIVE: 15 min **TOTAL:** 15 min

White beans mash seamlessly into a creamy protein-packed spread for a satisfying sandwich. Mix it up by trying it with canned chickpeas or black beans.

- 2 medium avocados
- 1 15-ounce can white beans, rinsed
- 2 tablespoons lemon juice
- 1 tablespoon extra-virgin olive oil
- 1 clove garlic, grated
- ¼ teaspoon chopped fresh thyme
- ¼ teaspoon ground pepper
- 8 slices whole-wheat bread, toasted
- 1 cup chopped jarred roasted red peppers, rinsed
- 8 thin slices sharp Cheddar cheese (about 4 ounces)
- 4 cups baby lettuce

Mash avocados, beans, lemon juice, oil, garlic, thyme and pepper in a medium bowl until well combined but still slightly chunky. Divide among 4 slices of bread (½ cup each). Top each sandwich with ¼ cup red peppers, 2 slices cheese, 1 cup lettuce and the remaining bread.

SERVES 4: 1 SANDWICH EACH
CAL 567 **FAT** 30G (SAT 9G) **CHOL** 28MG **CARBS** 55G **TOTAL SUGARS** 4G (ADDED 3G) **PROTEIN** 22G **FIBER** 15G **SODIUM** 941MG **POTASSIUM** 839MG

Coconut Black Rice Bowls with Tofu & Purple Asparagus

ACTIVE: 35 min **TOTAL:** 1 hour

Beyond produce, black beans, black rice and black sesame seeds all contain anthocyanins. So "forbidden" rice isn't just striking—it's also a serious nutrition upgrade. Simmering it in coconut milk adds rich aroma and flavor.

- **3 tablespoons avocado oil or peanut oil, divided**
- **1 tablespoon minced lemongrass**
- **3 teaspoons minced garlic, divided**
- **1 cup black rice**
- **1 15-ounce can light coconut milk**
- **⅓ cup water**
- **¾ teaspoon salt, divided**
- **2 tablespoons toasted sesame oil**
- **2 tablespoons reduced-sodium tamari or soy sauce**
- **1 tablespoon packed light brown sugar**
- **¼ teaspoon crushed red pepper**
- **1 14-ounce package extra-firm water-packed tofu**
- **1 pound purple asparagus, trimmed and cut into 1-inch pieces**
- **1 tablespoon grated peeled fresh ginger**
- **½ cup unsweetened shredded coconut**
- **1 tablespoon lime juice, plus lime wedges for serving**
- **1 teaspoon black sesame seeds**
- **3 scallions, sliced**
- **Opal basil leaves & thinly sliced purple daikon for garnish**

1. Heat 1 tablespoon avocado (or peanut) oil in a medium saucepan over medium heat. Add lemongrass and 1 teaspoon garlic and cook, stirring often, until fragrant, about 30 seconds. Add rice and stir to coat. Stir in coconut milk, water and ½ teaspoon salt. Bring to a simmer over high heat. Reduce heat to maintain a simmer, cover and cook until the rice is tender and the liquid has been absorbed, 35 to 45 minutes.

2. Meanwhile, whisk sesame oil, tamari (or soy sauce), brown sugar and crushed red pepper in a small bowl. Drain tofu and cut into 2-by-1½-inch slabs. Place between paper towels and press to remove excess moisture.

3. Heat the remaining 2 tablespoons avocado (or peanut) oil in a large cast-iron skillet over medium-high heat. Add the tofu and cook, flipping once, until golden and crispy, 8 to 10 minutes total. Remove to a plate and sprinkle with the remaining ¼ teaspoon salt. Add asparagus, ginger and the remaining 2 teaspoons garlic to the pan; cook, stirring, until the asparagus is tender-crisp, about 3 minutes. Remove from heat. Whisk the sauce and add to the pan along with the tofu; gently stir to coat.

4. Stir coconut and lime juice into the rice. Top the rice with the tofu mixture, sesame seeds and scallions. Serve with lime wedges and garnish with basil and daikon, if desired.

SERVES 4: 1¼ CUPS EACH
CAL 577 **FAT** 37G (SAT 14G) **CHOL** 0MG **CARBS** 50G **TOTAL SUGARS** 7G (ADDED 3G) **PROTEIN** 18 **FIBER** 8G **SODIUM** 815MG **POTASSIUM** 189MG

BBQ Shrimp with Garlicky Kale & Parmesan-Herb Couscous

ACTIVE: 20 min **TOTAL:** 20 min

In the U.S., dry whole-wheat couscous has been partially cooked, making it a quick-cooking (5 minutes!) whole-grain weeknight champ. And when you buy peeled shrimp, plus a bag of prechopped kale, the savings in prep time help get this dinner done in a jiff.

- **1 cup low-sodium chicken broth**
- **¼ teaspoon poultry seasoning**
- **⅔ cup whole-wheat couscous**
- **⅓ cup grated Parmesan cheese**
- **1 tablespoon butter**
- **3 tablespoons extra-virgin olive oil, divided**
- **8 cups chopped kale**
- **¼ cup water**
- **1 large clove garlic, smashed**
- **¼ teaspoon crushed red pepper**
- **¼ teaspoon salt**
- **1 pound peeled and deveined raw shrimp (26–30 per pound)**
- **¼ cup barbecue sauce**

1. Combine broth and poultry seasoning in a medium saucepan over medium-high heat. Bring to a boil. Stir in couscous. Remove from heat, cover and let stand for 5 minutes. Fluff with a fork, then stir in Parmesan and butter. Cover to keep warm.

2. Meanwhile, heat 1 tablespoon oil in large skillet over medium-high heat. Add kale and cook, stirring, until bright green, 1 to 2 minutes. Add water, cover and cook, stirring occasionally, until the kale is tender, about 3 minutes. Reduce heat to medium-low. Make a well in the center of the kale and add 1 tablespoon oil, garlic and crushed red pepper; cook, undisturbed, for 15 seconds, then stir the garlic oil into the kale and season with salt. Transfer to a bowl and cover to keep warm.

3. Add the remaining 1 tablespoon oil and shrimp to the pan. Cook, stirring, until the shrimp are pink and curled, about 2 minutes. Remove from heat and stir in barbecue sauce. Serve the shrimp with the kale and couscous.

SERVES 4: 3 OZ. SHRIMP, 1 CUP KALE & ½ CUP COUSCOUS EACH
CAL 414 **FAT** 17G (SAT 5G) **CHOL** 196MG **CARBS** 36G **TOTAL SUGARS** 7G (ADDED 4G) **PROTEIN** 32G **FIBER** 5G **SODIUM** 606MG **POTASSIUM** 566MG

Salmon with Curried Yogurt & Cucumber Salad

ACTIVE: 20 min **TOTAL:** 20 min

Three ingredients you probably already have on hand—curry powder, yogurt and lemon juice—meld into a mouthwatering sauce that transforms simple grilled salmon.

- **1¼ pounds sustainable wild or farmed salmon, cut into 4 portions**
- **2 tablespoons extra-virgin olive oil, divided**
- **½ teaspoon salt, divided**
- **½ teaspoon ground pepper, divided**
- **½ cup sliced cucumber**
- **2 tablespoons chopped fresh cilantro**
- **2 tablespoons minced shallot**
- **½ cup low-fat plain yogurt**
- **2 tablespoons lemon juice**
- **¼ teaspoon curry powder**

1. Preheat grill to medium-high.
2. Brush salmon with 1 tablespoon oil and sprinkle with ¼ teaspoon each salt and pepper.
3. Oil the grill rack. Grill the salmon, turning once, until just cooked through, about 6 minutes.
4. Meanwhile, combine cucumber, cilantro and shallot with the remaining 1 tablespoon oil and ⅛ teaspoon each salt and pepper in a medium bowl. Whisk yogurt, lemon juice, curry powder and the remaining ⅛ teaspoon each salt and pepper in a small bowl.
5. Serve the salmon with the yogurt sauce and the cucumber salad.

SERVES 4: 4 OZ. SALMON, 2 TBSP. SAUCE & 2 TBSP. CUCUMBERS EACH
CAL 258 **FAT** 13G (SAT 3G) **CHOL** 68MG
CARBS 4G **TOTAL SUGARS** 3G (ADDED 0G)
PROTEIN 30G **FIBER** 0G **SODIUM** 383MG
POTASSIUM 650MG

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BY BECKY DUFFETT

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The Key to Better Living

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